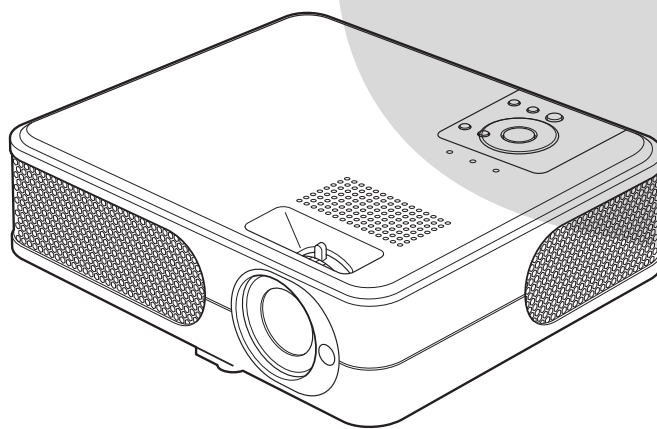


SERVICE MANUAL

3LCD DATA PROJECTOR

TLP-X2500E, TLP-X2500B
TLP-X2500U, TLP-X2500C
TLP-XC2500E, TLP-XC2500B
TLP-XC2500U, TLP-XC2500C



The above models are classified as green product (s) (*1), as indicated by the underlined serial number (s).
This Service Manual describes replacement parts for green product (s). When repairing any green product (s), use the parts described in this manual and lead-free solder (*2).
For (*1) and (*2) , see the next page.

(*1)

GREEN PRODUCT PROCUREMENT

The EC is actively promoting the WEEE & RoHS Directives that define standards for recycling and reuse of Waste Electrical and Electronic Equipment and for the Restriction of the use of certain Hazardous Substances. From July 1, 2006, the RoHS Directive will prohibit any marketing of new products containing lead.

Increasing attention is given to issues related to the global environmental. Toshiba Corporation recognizes environmental protection as a key management tasks, and is doing its utmost to enhance and improve the quality and scope of its environmental activities. In line with this, Toshiba proactively promotes Green Procurement, and seeks to purchase and use products, parts and materials that have low environmental impacts. Green procurement of parts is not only confined to manufacture. The same green parts used in manufacture must also be used as replacement parts.

(*2) LEAD-FREE SOLDER

This product is manufactured using lead-free solder as a part of a movement within the CE industry at large to be environmentally responsible. Lead-free solder must be used in the servicing and repair of this product.

WARNING

This product is manufactured using lead free solder.

DO NOT USE LEAD BASED SOLDER TO REPAIR THIS PRODUCT !

The melting temperature of lead-free solder is higher than that of leaded solder by 86° F to 104 ° F (30° C to 40° C). Use of a soldering iron designed for lead-based solders to repair product made with lead-free solder may result in damage to the component and or PCB being soldered. Great care should be made to ensure high-quality soldering when servicing this product—especially when soldering large components, through-hole pins, and on PCBs—as the level of heat required to melt lead-free solder is high.

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Specifications

■ List of general specifications

Item		Specification
Consumption Power		TLP-X2500: 300 W TLP-XC2500: 300 W
Weight		TLP-X2500: 2.8 kg TLP-XC2500: 4.0 kg
External Dimensions (including protruding parts)		TLP-X2500: 288 × 92 × 247 mm (W × H × D) TLP-XC2500: 370.5 × 92 × 249 mm (W × H × D)
Cabinet material		PC resin and PC+ABS resin
Conditions for usage environment		Temp: 5°C to 35°C; relative humidity: 30% to 70%
LCD Panel	Display method	3-panel transmission
	Panel size	0.63 type
	Drive system	TFT active matrix
	Picture elements	786,432 pixels (1024H × 768V)
Lens		Zoom lens F=1.6-1.88 f=18.6-22.3 mm
Lamp		High-pressure mercury lamp (200 W)
Connection terminal	Projection screen size	33-300 inches
	Projection distance	1.15-8.80 m
	Speaker	1W (Mono)
	COMPUTER 1 IN terminal	Mini D sub 15 pin RGB / Y/Pb/Pr (dual use)
	COMPUTER 2 IN terminal	Mini D sub 15 pin RGB / Y/Pb/Pr / MONITOR OUT (dual use)
	S-VIDEO terminal	Mini DIN 4 pin
	AUDIO (L/R) terminal	RCA Pin Jack × 2
	VIDEO terminal	RCA Pin Jack
	AUDIO IN terminal	3.5mm dia. stereo mini-jack
	AUDIO OUT terminal	3.5mm dia. stereo mini-jack
	CONTROL terminal	Mini DIN 8 pin (RS-232C)

■ Document camera specifications (Models equipped with document camera)

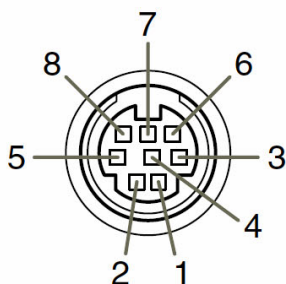
Item	Specification
Cameral lens	F=3.0, f=9.6 mm
Focus adjustment	Manual
Zoom adjustment	None (Adjust with the distance from the object)
Image Pick-Up Device	3 million pixel 1/2" color CMOS Sensor
Pixels	QXGA (horizontal 2048 × vertical 1536)
Illumination	High brightness LED LED illumination

■ Notes

- This model complies with the above specifications.
- Designs and specifications are subject to change without notice.
- This model may not be compatible with features and/or specifications that may be added in the future.

■ CONTROL terminal

● Pin assignment



Mini DIN 8 pin connector

Pin No.	Signal Name	Description
1	RXD	Receiving data
2	CTS	Consent to send
3	DSR	Data set ready
4	GND	Signal ground
5	RTS	Request to send
6	N.C	No connection
7	TXD	Sending data
8	GND	Signal ground

● Interface format

- 1 Communication method RS-232C, 9600bps, No Parity, Data Length: 8 bits;
Stop Bit Length: 1 bit
- 2 Communication format

STX (02h)	Command (3Byte)	ETX (03h)
-----------	-----------------	-----------

Only 1 command valid per communication.
- 3 Data format For input commands, only ASCII-compliant all-uppercase alphanumeric characters supported.
- 4 Replies Acknowledge

ACK (06h)	CR (0Dh)	Data
ACK (06h)	ESC (1Bh)	

 ... Normally ended
... Aborted
 No acknowledge

NAK (15h)

If commands are to be sent consecutively, wait for the response from the projector before sending the next command.

● Main Commands

Item	Command
Power on	PON
Power off	POF
Icon display on	MO0
Icon display off	MO1
Auto setting (RGB input)	PAT
Status display on	DON
Status display off	DOF

■ Note

- Contact your dealer for control cable and other commands.

■ Separately sold product

Replacement Lamp Model TLPLW11

Using the Menus

You can call up on-screen menus, and conduct a number of adjustments and settings using the operation buttons on the control panel (main unit side) and remote control.

How to use the menus






The menu shown below is for operation instructions purposes and might differ from the actual display.

1. Press the MENU button Display the Setting display menu.

2. Select a Category

Select a category by using ◀ ▶

There are following 5 categories:

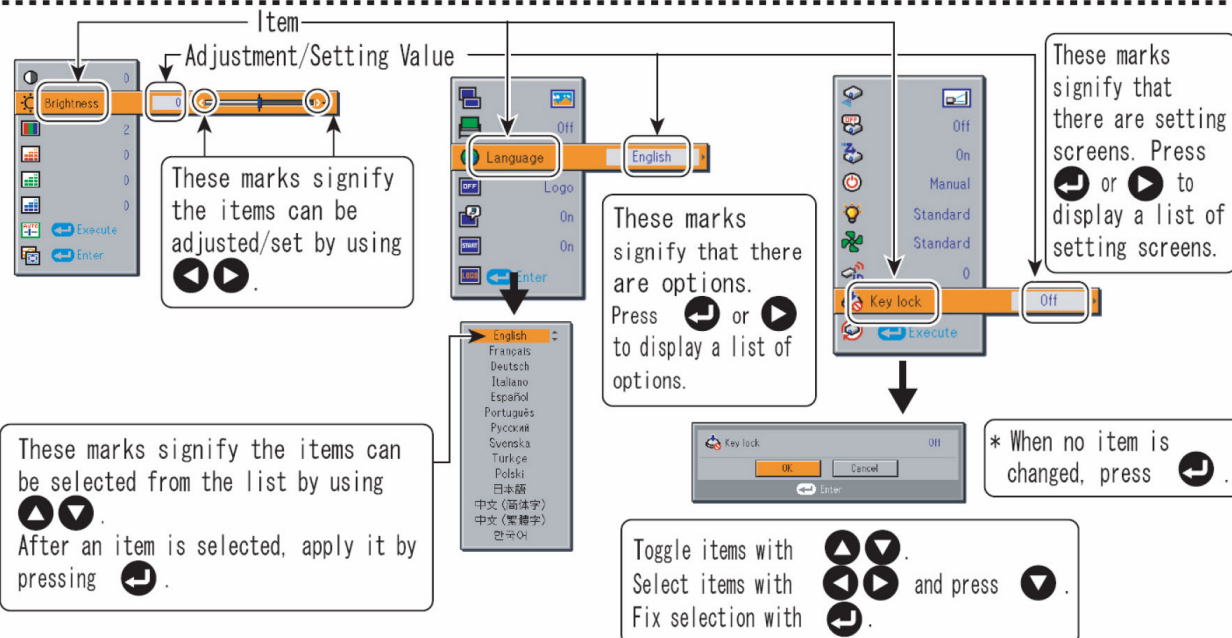
-  Image adjustment menu
-  Display setting menu
-  Default setting 1 menu
-  Default setting 2 menu
-  Status display menu



Displays the current adjustments and settings of selected category.
Item shown with gray cannot be adjusted with the current input source.

3. Adjustments & Settings

Press ◀ or ▶ to open the menu.

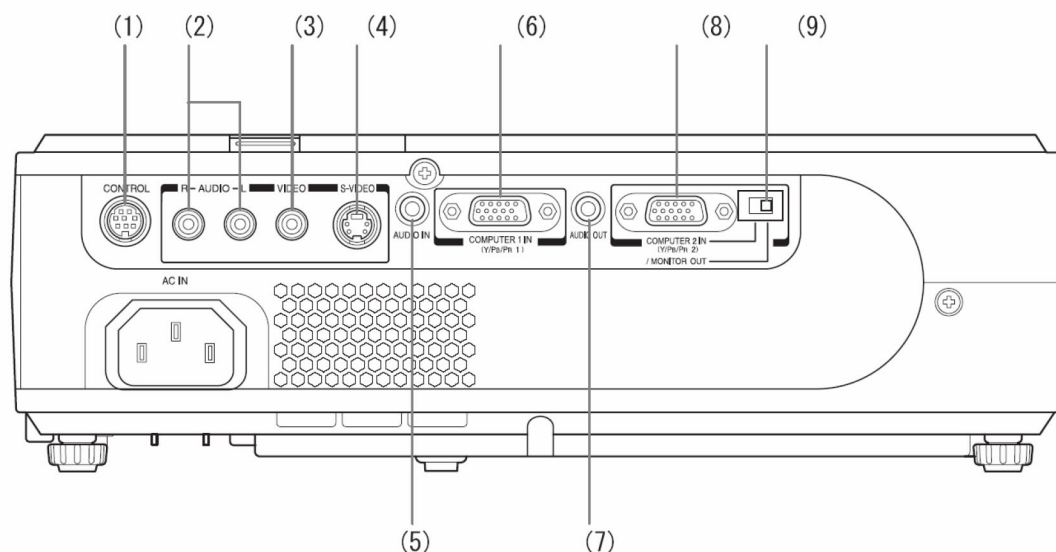


- The figure shows displays given for operation instructions purposes. As the display may differ depending on the item, use the following pages as a reference.
- To return to previous item, press the RETURN button.

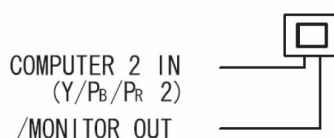
4. End Press the MENU button.

(The menu disappears about 30 seconds after the last operation.)

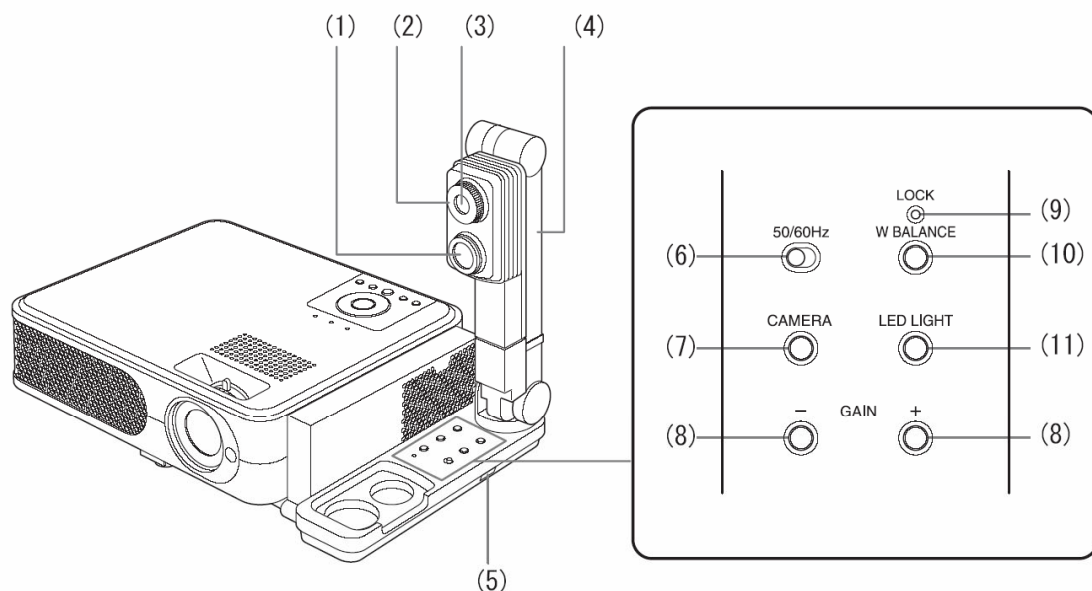
Names of the Terminals on the Rear Panel



Name	Main Function
(1) CONTROL terminal	: When operating the projector via a computer, connect this to the controlling computer's RS-232C port.
(2) AUDIO (L/R) terminal	: Input audio signals from video equipment.
(3) VIDEO terminal	: Input video signals from video equipment.
(4) S-VIDEO terminal	: Input S video signals from video equipment.
(5) AUDIO IN terminal	: Input audio signals from a computer, or from video equipment with a component video signal output terminal.
(6) COMPUTER 1 IN terminal	: Input RGB signal from a computer or other source or a component video signal (Y/P _B /P _R) from video equipment.
(7) AUDIO OUT terminal	: Outputs audio signals.
(8) COMPUTER 2 IN terminal (Also used for MONITOR OUT terminal)	: Inputs RGB signal from a computer or other source or a component video signal (Y/P _B /P _R) from video equipment. It can also be used as MONITOR OUT terminal by the switch of (9).
(9) Switch	: Switches between COMPUTER 2 IN and MONITOR OUT.



Names of each part on document camera (models with a document camera)



Name	Main Function
Camera	
(1) LED illumination	: The illumination LED for referring documents.
(2) Focus ring	: Adjusts the focus.
(3) Camera lens	: The camera lens of the document camera.
(4) Camera arm	: Adjusts the camera angle.
(5) Infrared remote sensor	: Senses commands from the remote control.
Control Panel	
(6) 50/60 Hz switch	: Matches the shutter speed of the camera to your power system frequency.
(7) CAMERA button	: Switches between the camera input and the previous input.
(8) CAMERA GAIN button	: Adjusts the camera gain.
(9) LOCK (W. BALANCE) indicator	: Lights when the white balance has been locked.
(10) W. BALANCE button	: Switches between auto and locking of white balance.
(11) LED LIGHT button	: Switches on/off the LED illumination.

List of Supported Signals

■ List of supported signals (RGB signals)

This projector supports the following RGB signals. Note, however, that depending on the computer model, the screen may show flicker or streaking. Please adjust the projector if this happens.

Resolution	Mode	Refresh rate (Hz)	H-frequency (kHz)	Clock (MHz)
720 x 400	720x400_85	85.039	37.927	35.500
640 x 480	VGA_60	59.940	31.469	25.175
	VGA_72	72.809	37.861	31.500
	VGA_75	75.000	37.500	31.500
	VGA_85	85.008	43.269	36.000
800 x 600	SVGA_56	56.250	35.156	36.000
	SVGA_60	60.317	37.879	40.000
	SVGA_72	72.188	48.077	50.000
	SVGA_75	75.000	46.875	49.500
	SVGA_85	85.061	53.674	56.250
832 x 624	MAC16"	74.550	49.725	57.283
1024 x 768	XGA_60	60.004	48.363	65.000
	XGA_70	70.069	56.476	75.000
	XGA_75	75.029	60.023	78.750
	XGA_85	84.997	68.667	94.500
	MAC19"	74.700	60.134	79.857
1152 x 864	SXGA1_75	75.000	67.500	108.000
1280 x 960	QuadVGA_60	60.000	60.000	108.000
	QuadVGA_85	85.002	85.938	148.500
1280 x 1024	SXGA3_60	60.020	63.981	108.000
	SXGA3_75	75.025	79.976	135.000
	SXGA3_85	85.024	91.146	157.500
1400 x 1050	SXGA+	59.978	65.317	121.750
1600 x 1200	UXGA_60	60.000	75.000	162.000
	UXGA_65	65.000	81.250	175.500
	UXGA_70	70.000	87.500	189.000
	UXGA_75	75.000	93.750	202.500
	UXGA_85	85.000	106.250	229.500

■ Note

- Signals whose resolution exceeds the native resolution (1024 × 768 pixels) will be compressed. For this reason, some information may be lost, or image quality may be affected.

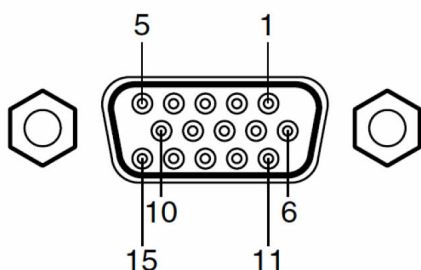
■ List of supported signals (Y/P_B/P_R signals)

Signal format	fh(kHz)	fv(Hz)
480i(525i)@60Hz	15.73	59.94
480p(525p)@60Hz	31.47	59.94
576i(625i)@50Hz	15.63	50.00
576p(625p)@50Hz	31.25	50.00
720p(750p)@60Hz	45.00	60.00
720p(750p)@50Hz	37.50	50.00
1080i(1125i)@60Hz	33.75	60.00
1080i(1125i)@50Hz	28.13	50.00

■ List of supported signals (Video, S-Video signals)

Video mode	fh(kHz)	fv(Hz)	fsc(MHz)
NTSC	15.73	60	3.58
PAL	15.63	50	4.43
SECAM	15.63	50	4.25 or 4.41
PAL-M	15.73	60	3.58
PAL-N	15.63	50	3.58
PAL-60	15.73	60	4.43
NTSC4.43	15.73	60	4.43

■ Pin assignment of COMPUTER 1 IN, COMPUTER 2 IN & MONITOR OUT terminals



Mini D sub 15 Pin connector

Input Signal

• RGB input

RGB signals: 0.7V (p-p) 75 Ω
 Horizontal sync signal: TTL level (Pos/neg polarity)
 Vertical sync signal: TTL level (Pos/neg polarity)

• Y/P_B/P_R input

Y signal: 1.0V (p-p) 75 Ω
 P_B/P_R signals: 0.7V (p-p) 75 Ω

Pin No.	Pin description	
	During RGB input	During Y/P _B /P _R input
1	Video signal (R)	Color difference signal (P _R)
2	Video signal (G)	Luminance signal (Y)
3	Video signal (B)	Color difference signal (P _B)
4	GND	*
5	GND	*
6	GND (R)	GND (P _R)
7	GND (G)	GND (Y)
8	GND (B)	GND (P _B)
9	N.C	*
10	GND	*
11	GND	*
12	N.C	*
13	Horizontal sync signal	*
14	Vertical sync signal	*
15	N.C	*

* Do not connect anything.

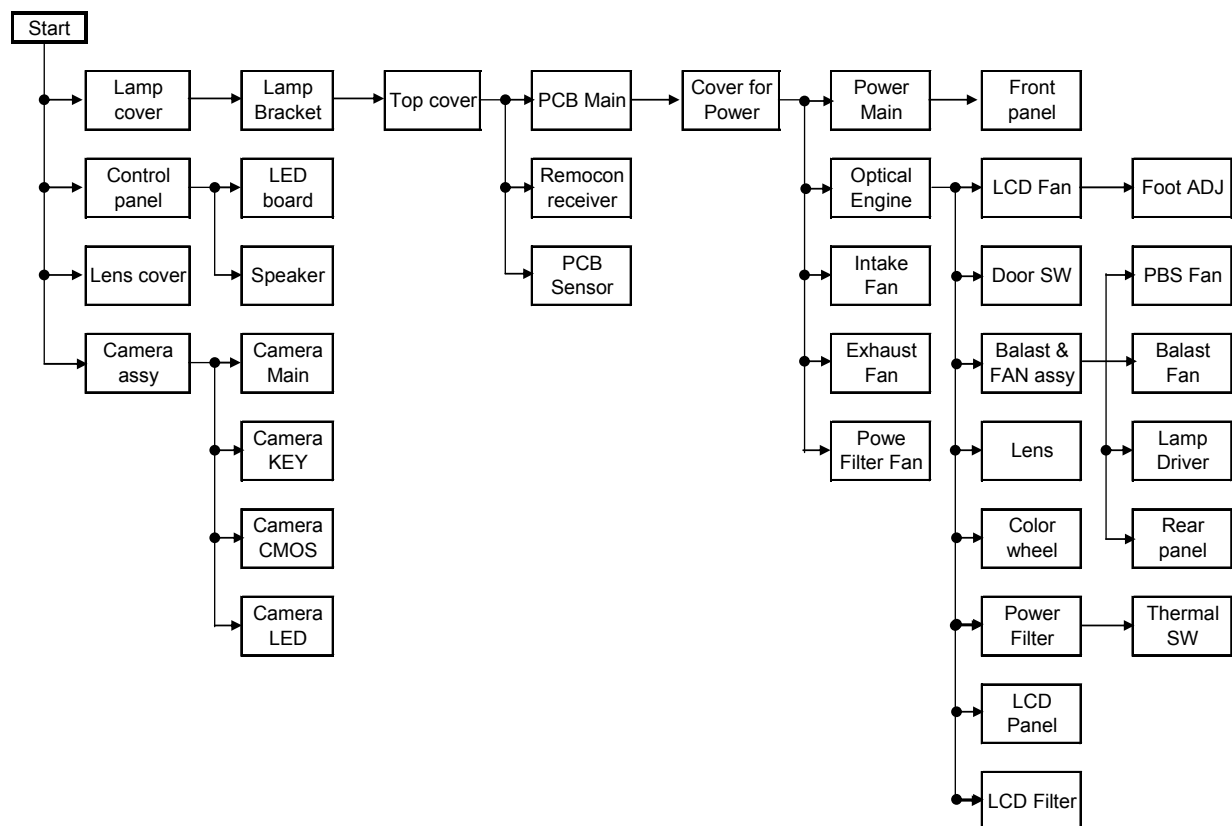
Replaceable Part Hierarchy

Replaceable Part Hierarchy





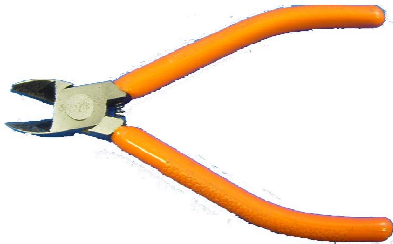
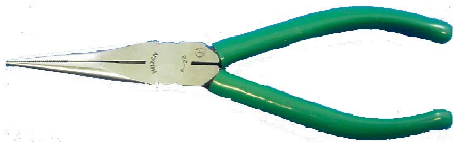
The flow chart below shows what parts must be removed to access each replaceable part in the projector.

The parts on the first level (Ex.Lamp cover) are accessible without removing any other parts.

The more levels down that a part is, the more parts you need to remove in order to access it.






Required Tools

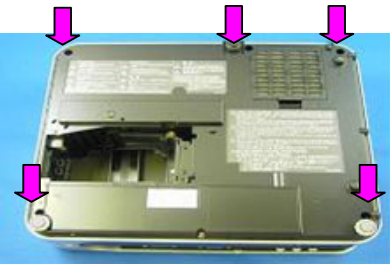
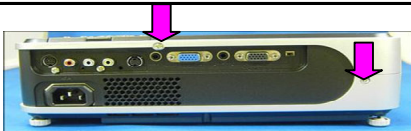

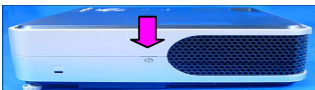

Item	Photo
Driver bit (+) No 2	
Box driver M3	
Driver bit (+) No 0	
Torque driver bit (+) No 2	
Nippers	
Cutting pliers	

Parts Replacement

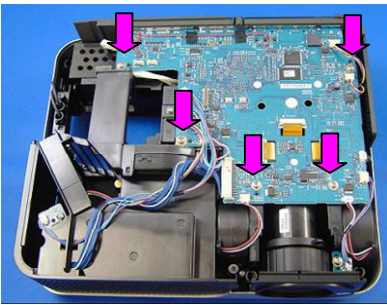

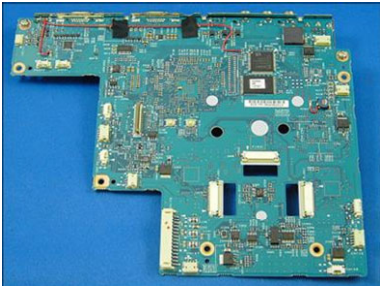
1.Lamp

No	Figure	Explanation
1		Remove two lamp cover screws.
		Remove three lamp screws.
2		Lamp is pulled out.

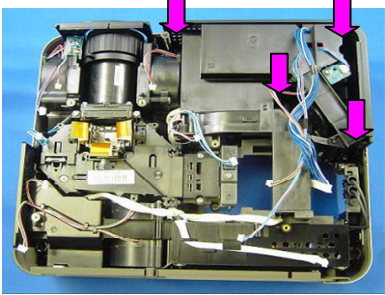
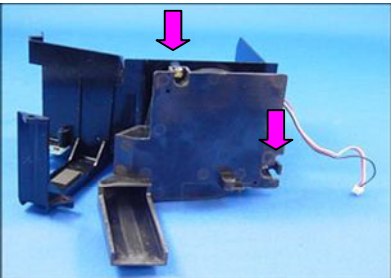
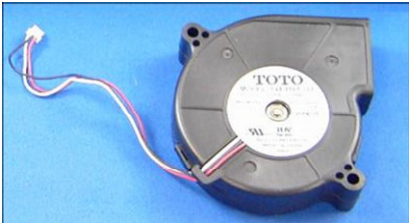
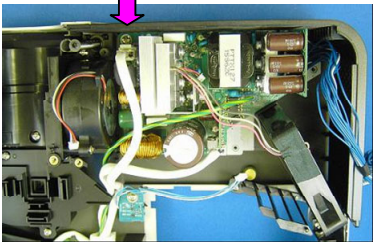
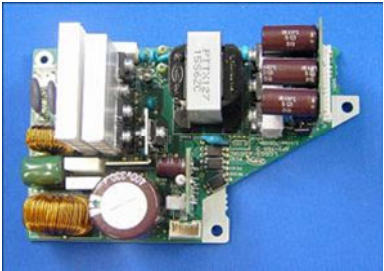
2.Top Cover

		Remove five screws at the bottom.
		Remove two screws at the rear.
		Remove a screw at the right.
		Remove a screw at the left.
3		Top cover is removed.

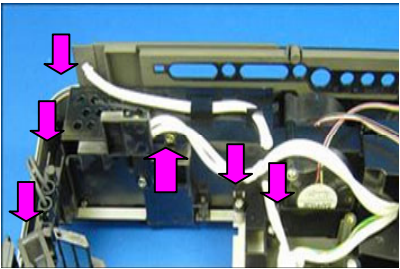
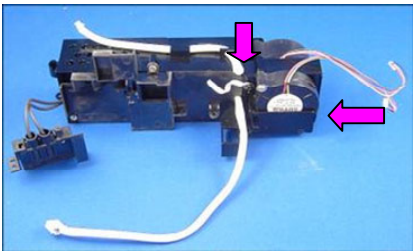
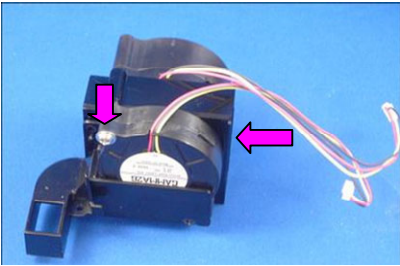
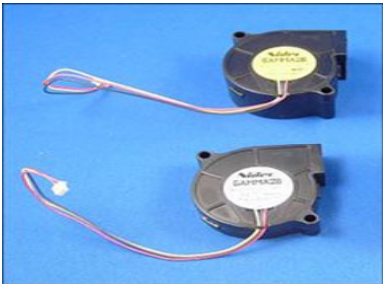
3.Main Board

Step	Figure	Explanation
1		All the connectors on a main board unit are removed. Remove five screws.
2		Remove two screws at the rear cover.
3		Main board is removed.

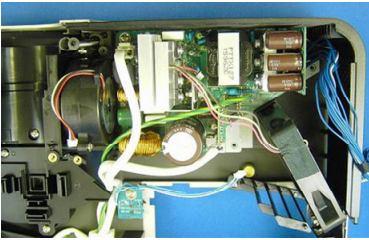

4. Main Power Unit

Step	Figure	Explanation
1		Remove four screws.
2		Cover & Power Intake FAN are removed. Remove two screws.
3		Power Intake FAN are removed.
4		Remove a screw.
5		Main Power Unit is taken out.

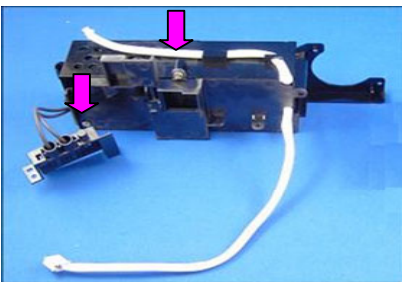
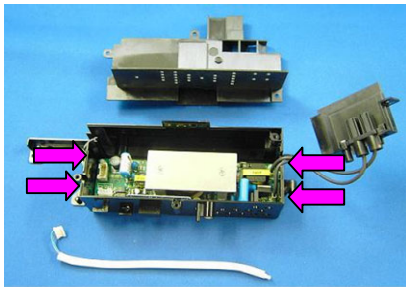
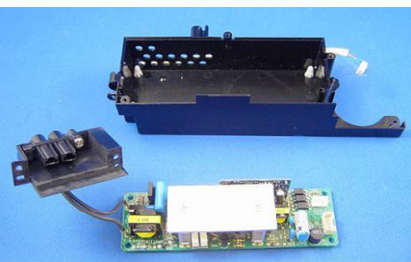
5.PBS & Ballast FANs

Step	Figure	Explanation
1		Remove six screws.
2		Balast & FAN assy is taken out. Remove two screws.
3		Remove two screws.
4		Ballast FANs are removed. PBS FANs are removed.

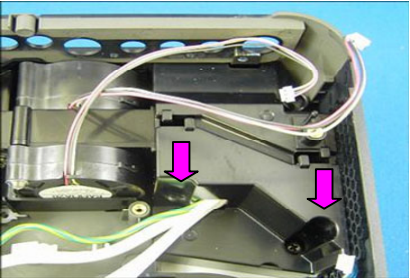
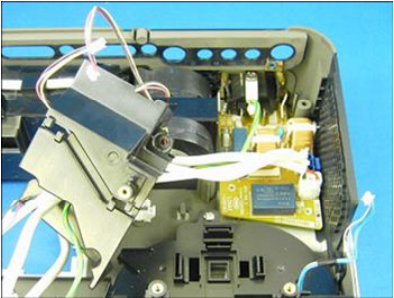
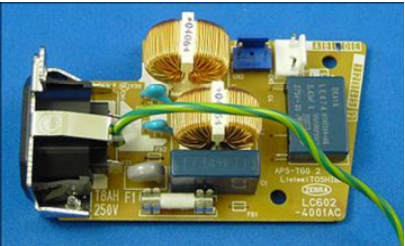
6.Exhaust Fan

1		<p>Remove no screw.</p> <p>Note. May be very tight.</p>
2		<p>Exhaust Fan is removed.</p>

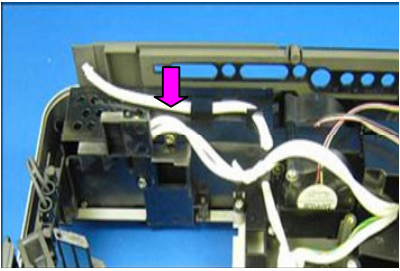
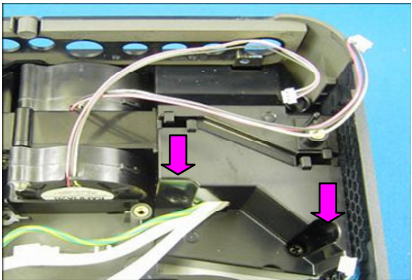
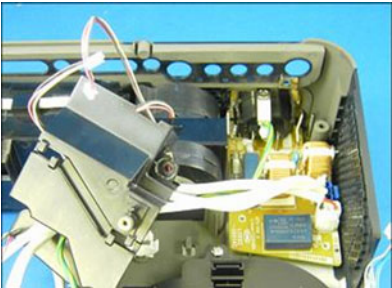

7.Ballast

1		<p>Remove two screws.</p>
2		<p>Cover is removed.</p> <p>Pinch a stud with cutting pliers. (4 points) Then pull up PC Board.</p>
3		<p>Ballast is removed.</p>

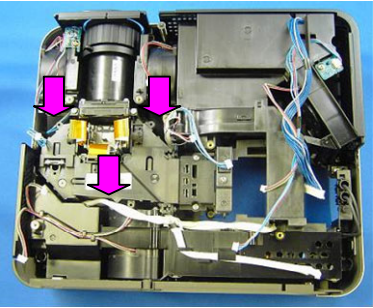
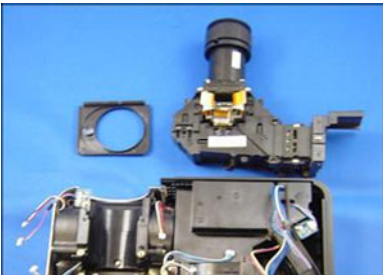
8.Filter Power

Step	Figure	Explanation
1		Remove two screws.
2		Cover is removed.
3		Filter Power is taken out.

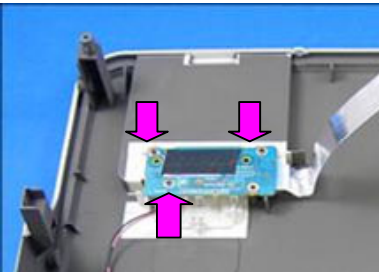
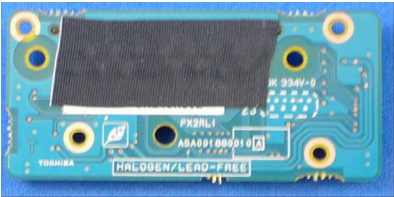
9. Thermal Switch

Step	Figure	Explanation
1		Remove a screws.
2		Remove two screws.
3		Cover is removed.
4		Thermal Switch is removed.

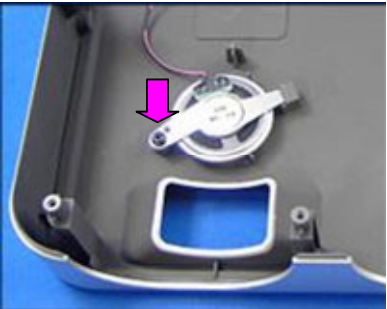
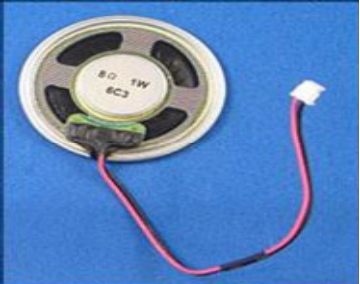
10.Optical Engine

Step	Figure	Explanation
1		Remove three screws.
2		Optical Engine is taken out.


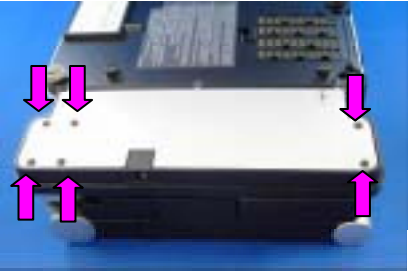
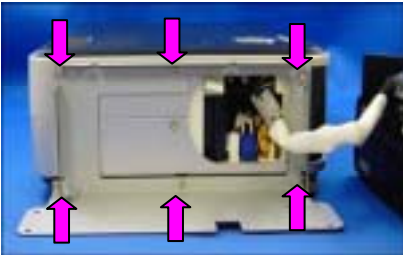
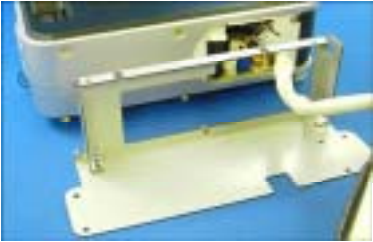

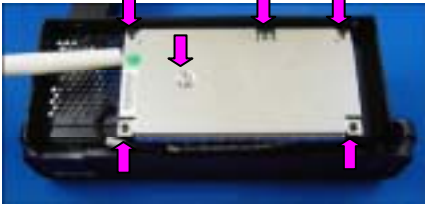
11.Relay Board


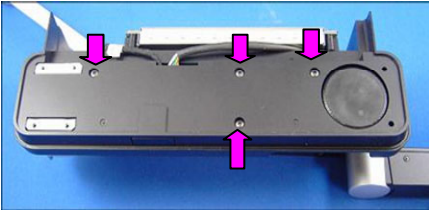
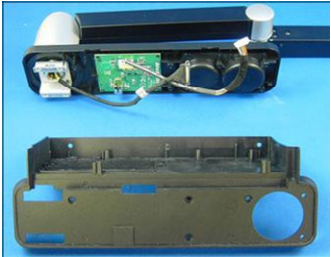
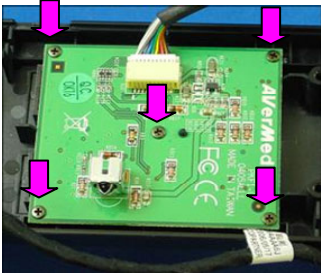
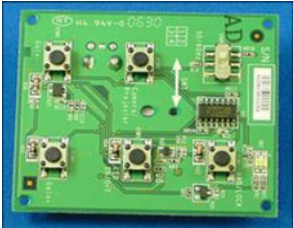
Step	Figure	Explanation
1		Remove three screws.
2		Relay Board is removed.


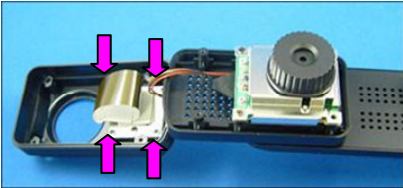

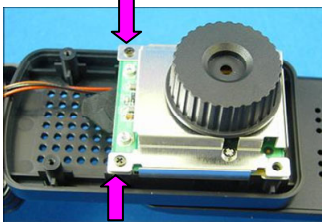
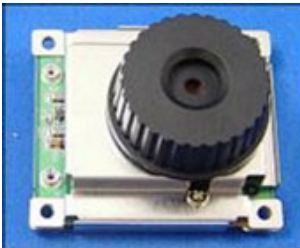
15.Speaker

1		Remove a screws.
2		Speaker is removed.

13.CAMERA ASSY.

No	Figure	Explanation
1		Remove two screws.
2		Remove six screws.
3		Remove six screws.
4		Remove cable connector.
		Blaket base is removed.
5		Remove six screws.

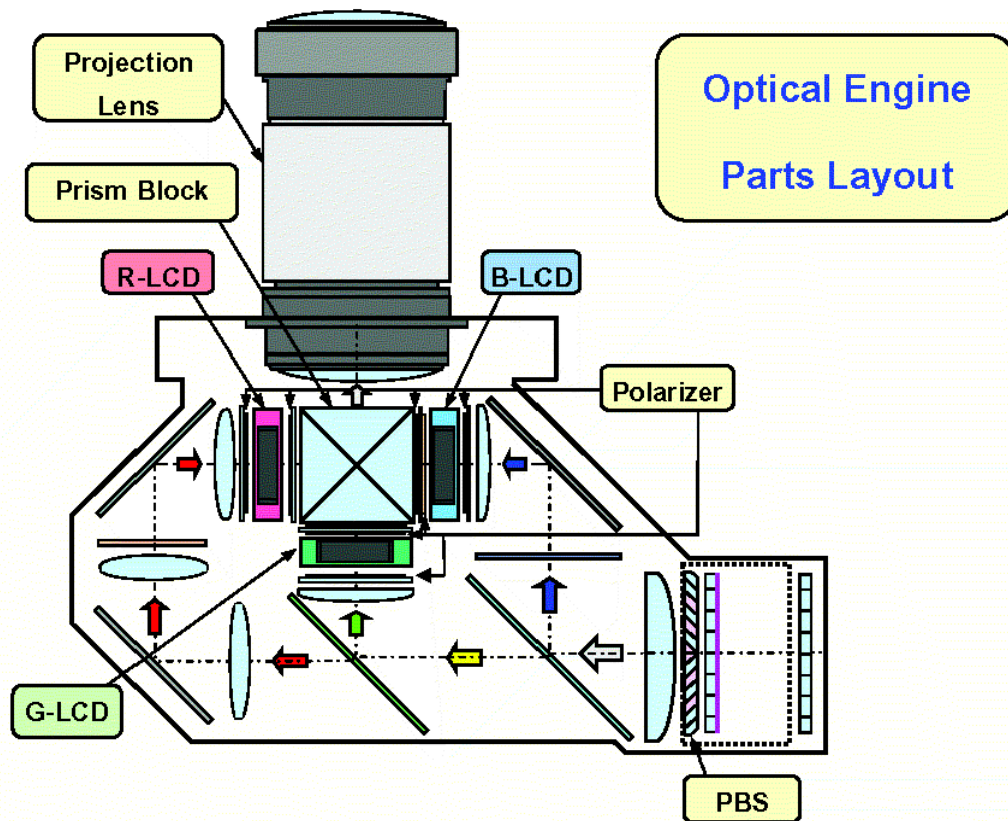
No	Figure	Explanation
6		Cover is removed.
7		Remove four screws.
8		Bottom cover is removed.
9		Remove five screws.
10		PC Board is removed.

No	Figure	Explanation
11		Remove four screws.
12		Remove four screws.
13		LED illumination & Cover are removed.
14		Remove two screws.
15		Camera head is removed.

Replacement of Optical Parts

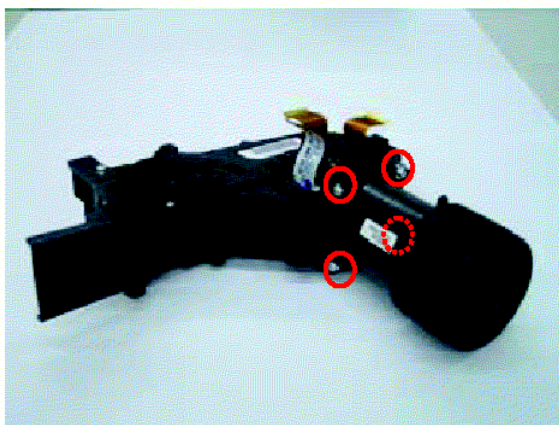
CAUTION!

- 1) When you replace each part, take an air blow, and prevent adhesion of dust.
- 2) Not touching glass side of optical parts. When you touched it, wipe it off with optics paper and so on.
Because it is easy to scratch in particular, be careful to the handling of a polarizer.



Projection Lens

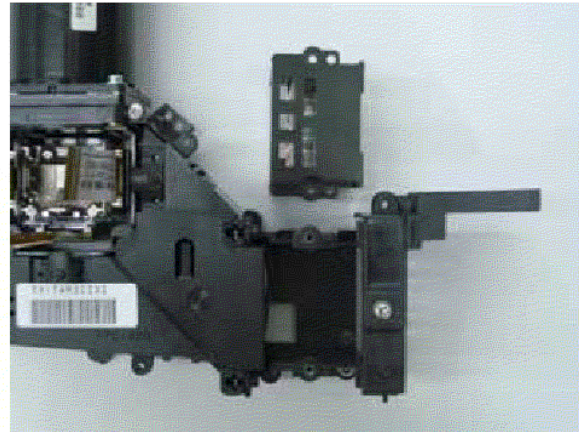
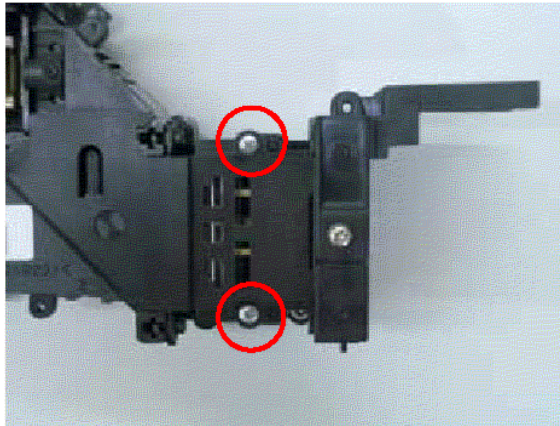
1. A Projection Lens comes off when you remove four screws.



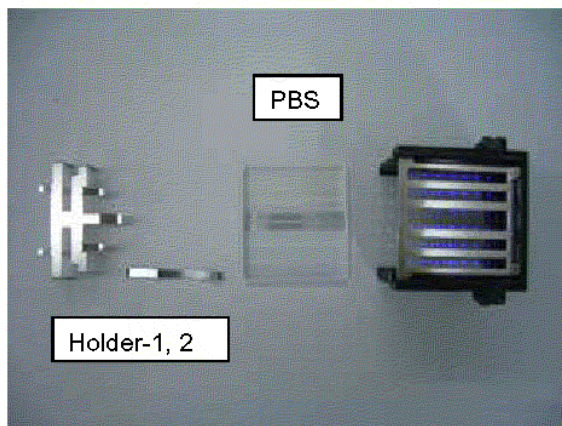
2. Put on a new Projection Lens so that a knob of a focus ring becomes the top.

PBS (Polarized Beam Splitter)

1. Remove two screws.

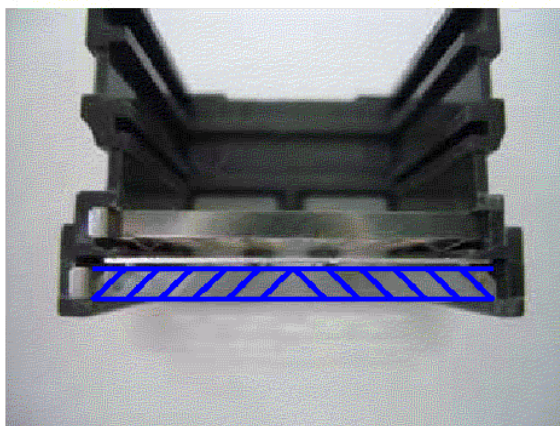


2. Remove Holder-1 and 2, afterwards remove PBS from PBS Unit.



3. Replace a PBS.

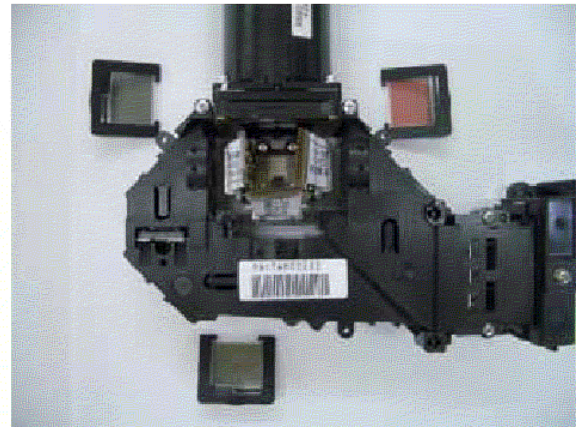
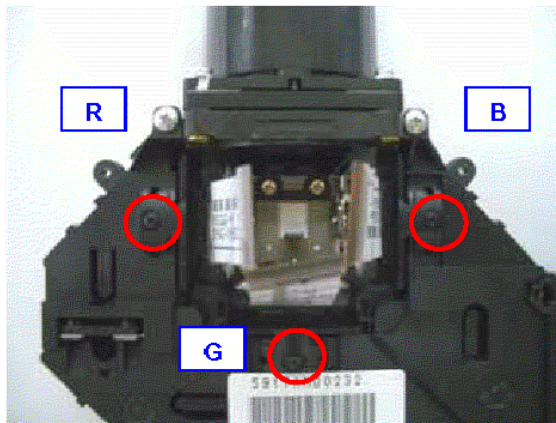
There is directionality on the front and back to a PBS, and put it on like a photo.



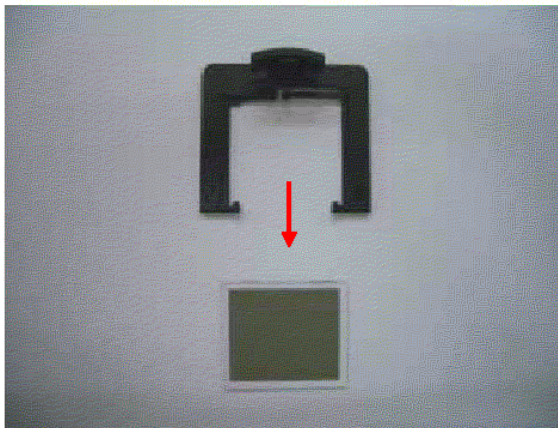
4. Put on Holder-1 and 2, and slot a PBS Unit in an Optical Engine.

Polarizer (Entrance)

1. Remove screws like photos.

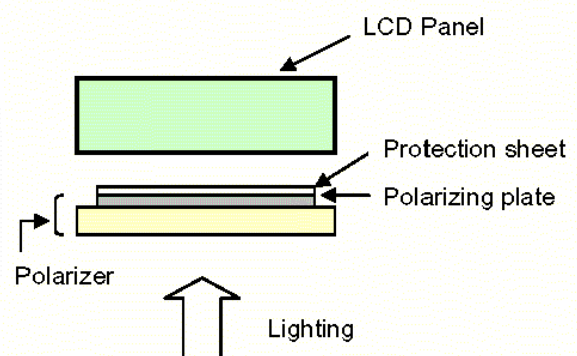
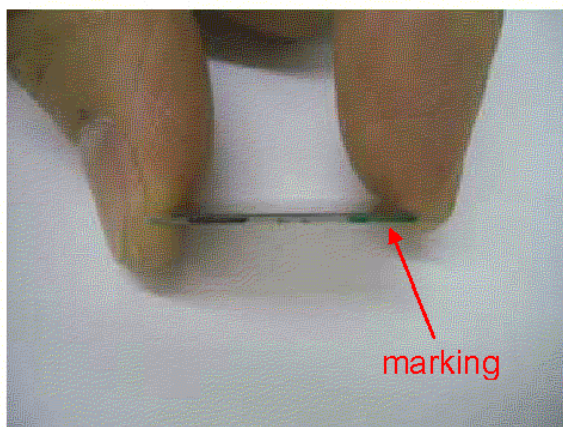


2. Remove a Polarizer from a Holder.



3. Be careful to the following points when you put on a new Polarizer to a polarizer holder.

1) Get the marking in the upper part.



2) Make a polarizing plate side to the LCD Panel side.

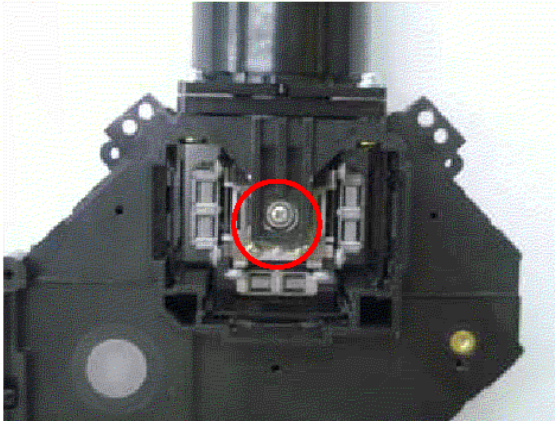
3) Take off Protection sheet of a polarizing plate side.

4. Tighten a polarizer holder to become the screw hole center.



Polarizer (Exit)

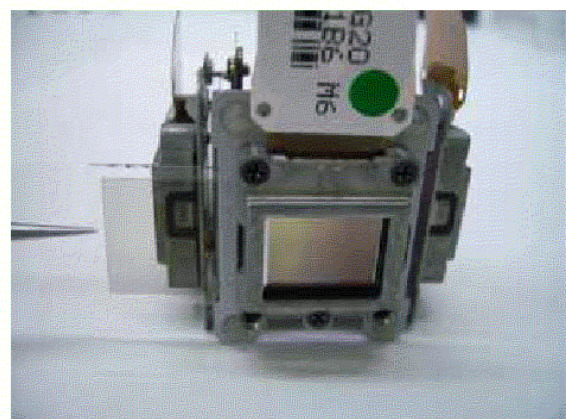
1. Remove one screw, and take off a Prism Block.



< Lower side >

2. Remove one screw of a polarizer holder.

Take a polarizer off the side.



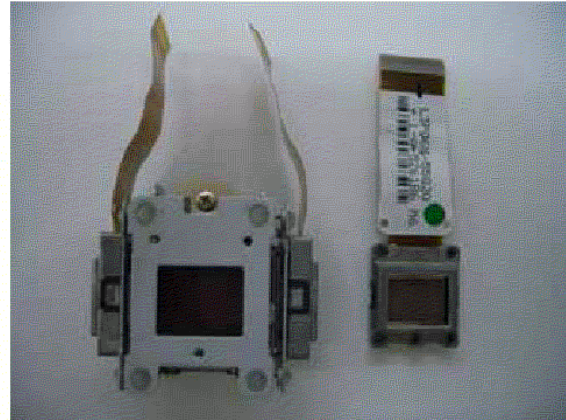
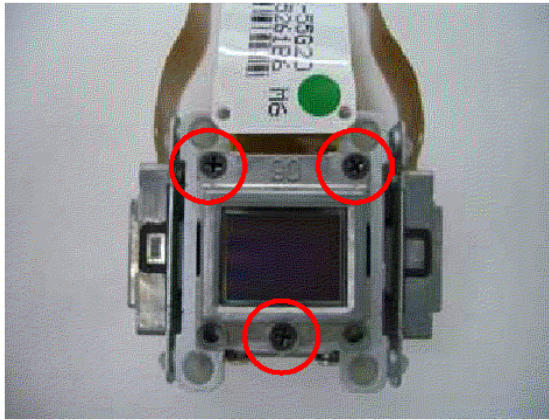
3. When put on a new Polarizer, be careful to the following points.

- 1) Get the marking in the upper part.
- 2) Make a polarizing plate side to the LCD Panel side.
- 3) Take off protection sheet of a polarizing plate side.

4. Hold a polarizer with a polarizer holder.

LCD Panel

1. Remove Prism block from Optical Engine.
2. Remove three screws.



3. Check the model number of LCD Panel.

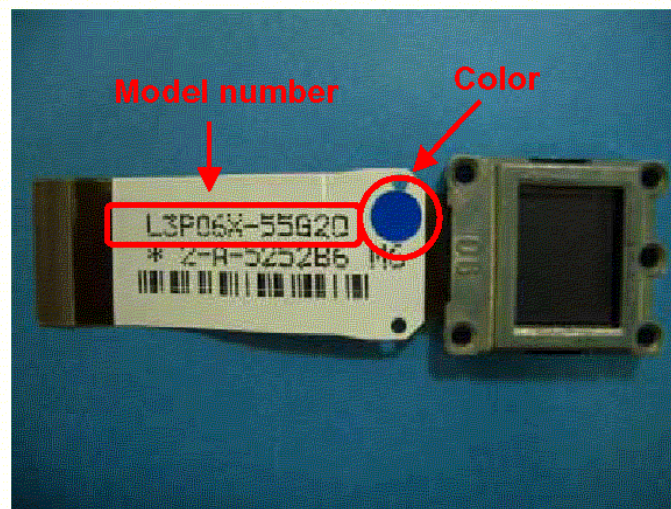
There are two kinds of model number on an RGB panel each.

Model number : L3P06X-65G00

(X2500) : L3P06X-66G00

Model number : L3P07X-65G00

(X3000) : L3P07X-66G00



Example : X2000

4. Alignment a pixel with a panel installation tools.

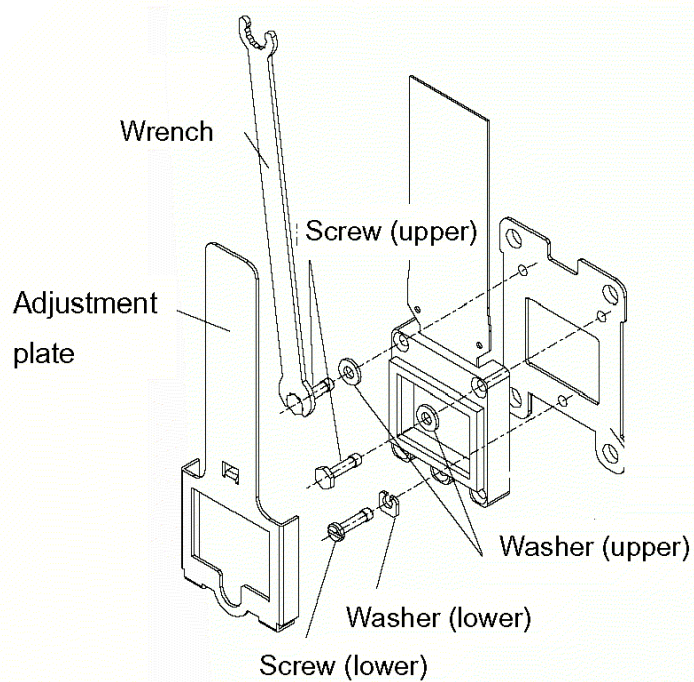
<Panel installation tools (X2500)>



Wrench

Adjustment Plate

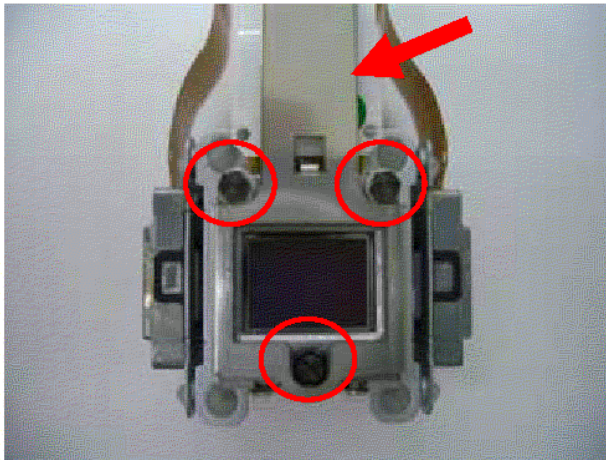
Screw & Washer



5. Tighten temporary a LCD Panel with screws and washers.

Use a minus screw and an offset washer in bottom of a LCD Panel.

Get Prism block to an Optical Engine after putting on adjustment plate.

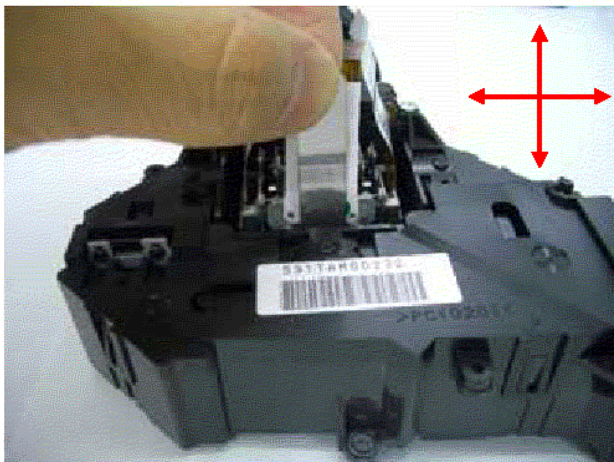


6. Set an Engine to a projector and extend a predetermined cable with the extension cable.

7. Project a cross hatch signal, and alignment a pixel with a panel installation tools.



8. When pixel alignment is completed, take off Adjustment plate and build a projector.

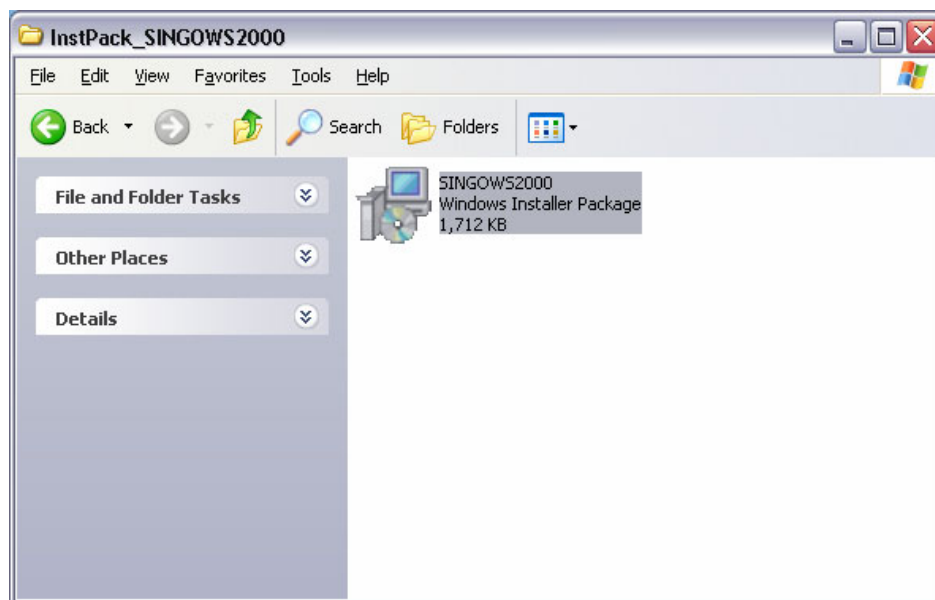


9. Set up **VCOM**, **GAMMA** and **SHADING** with the adjustment software (See Electrical Adjustment).

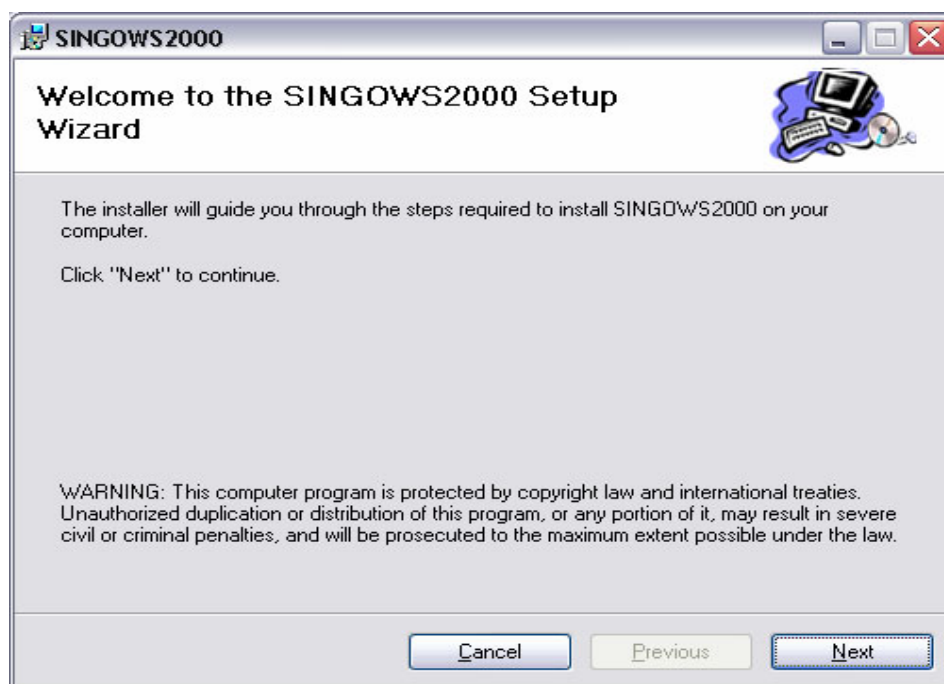
SINGOWS 2000

Install the Software on the Computer

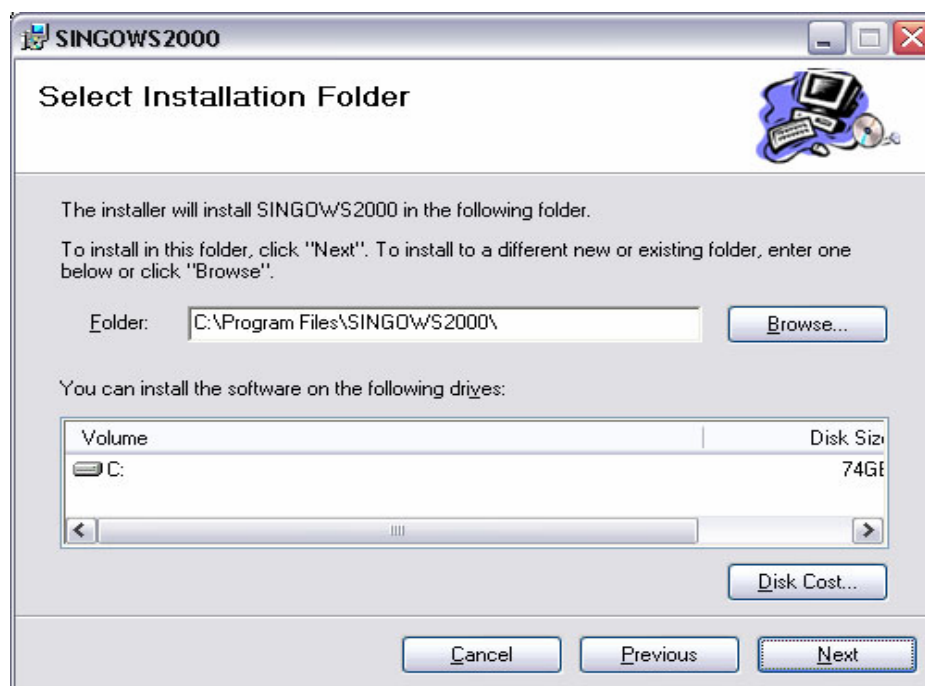
The software you download is bundled into one .MSI file.
Double-click the file to install the signal generating software.



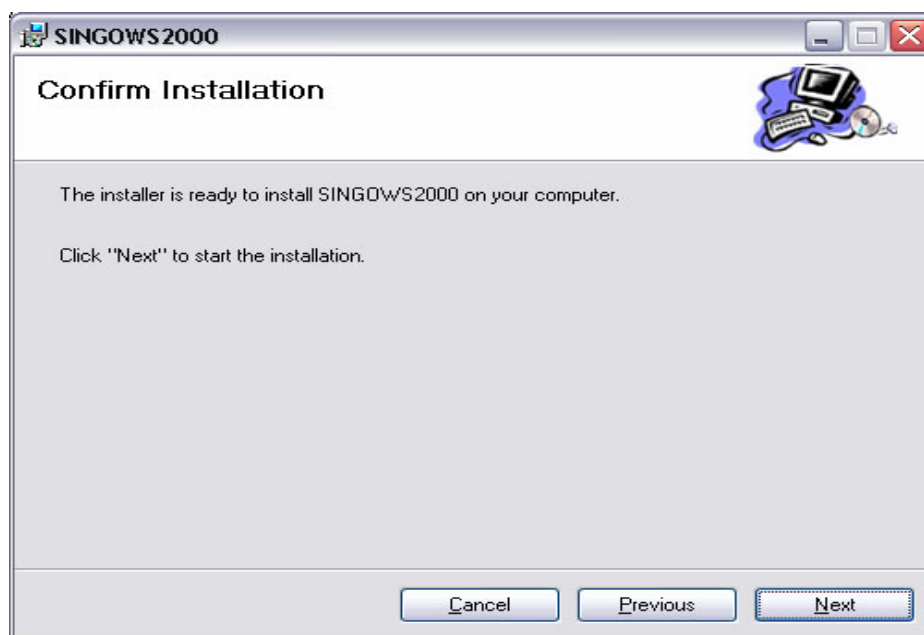
The Install Wizard appears, ready to begin the install process.
Click the next button.



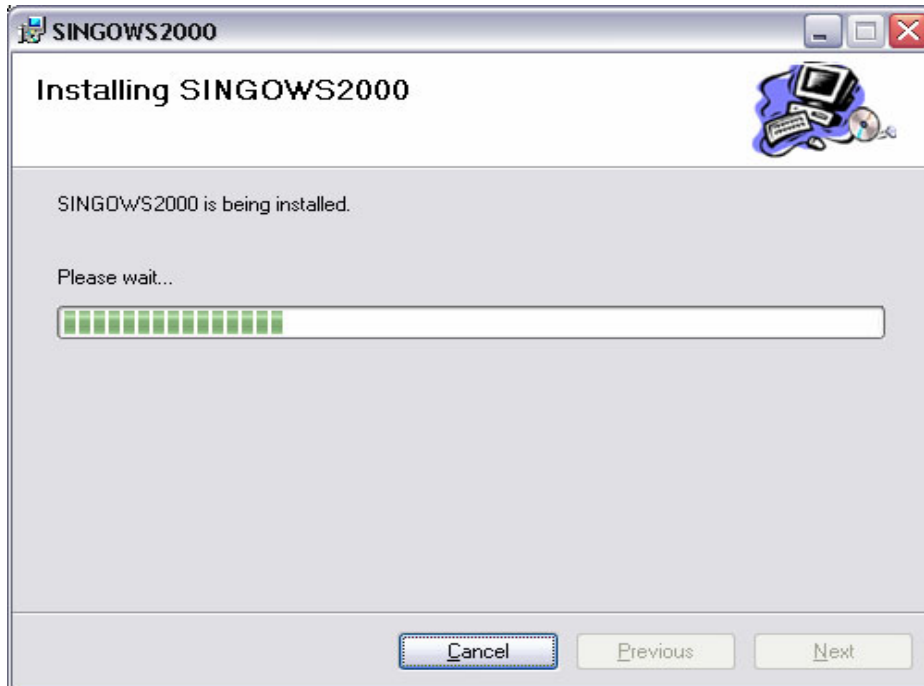
The Select Installation Folder dialog box appears.
Navigate to the location where you stored the software files.
Click the next button.



The confirm Installation dialog box appears.
Click the next button.



The Installing software dialog box appears.

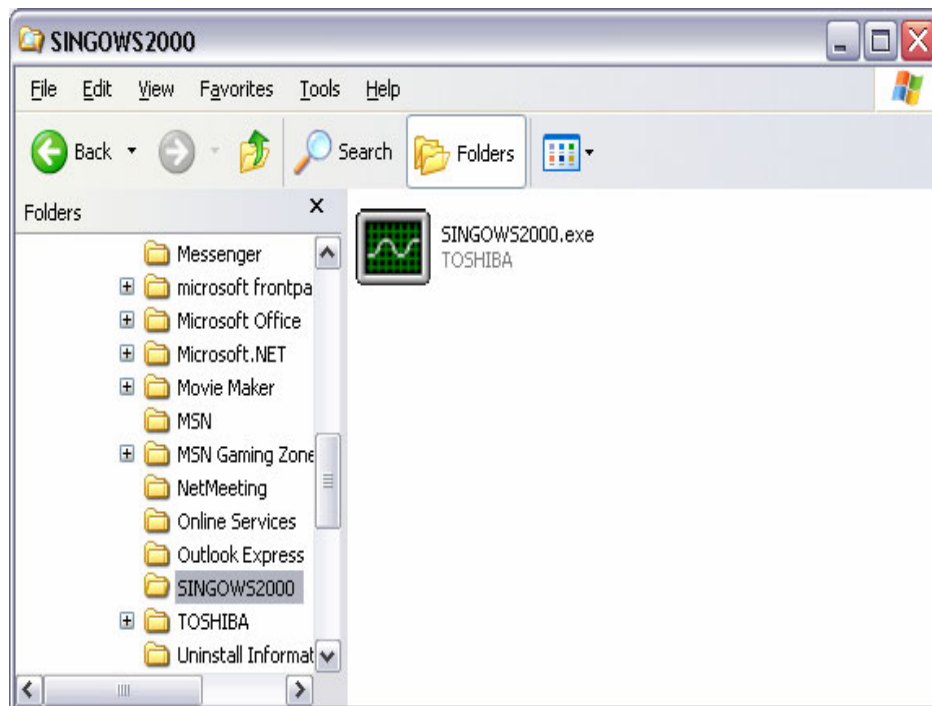


The Installation Complete dialog box appears.
Click the close button.

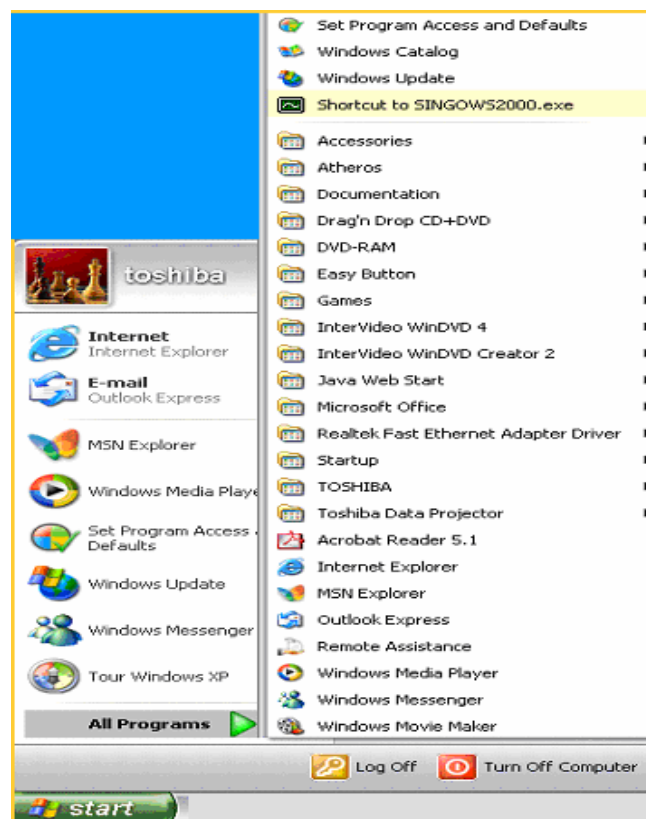


Startup the Software

Open Windows Explorer, navigate to the location where you stored the files, Then double click the **SINGOWS2000.EXE**.



Moreover, even if it chooses the shortcut of the All programs of start, it can startup.



Firmware Upgrade

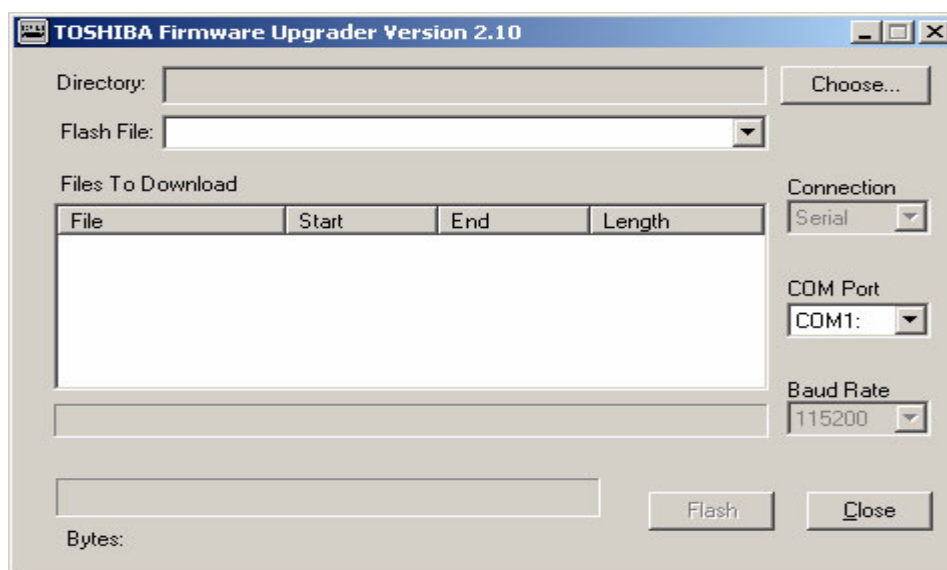
Upgrade the software

Connect the control cable to the control terminal on the projector.

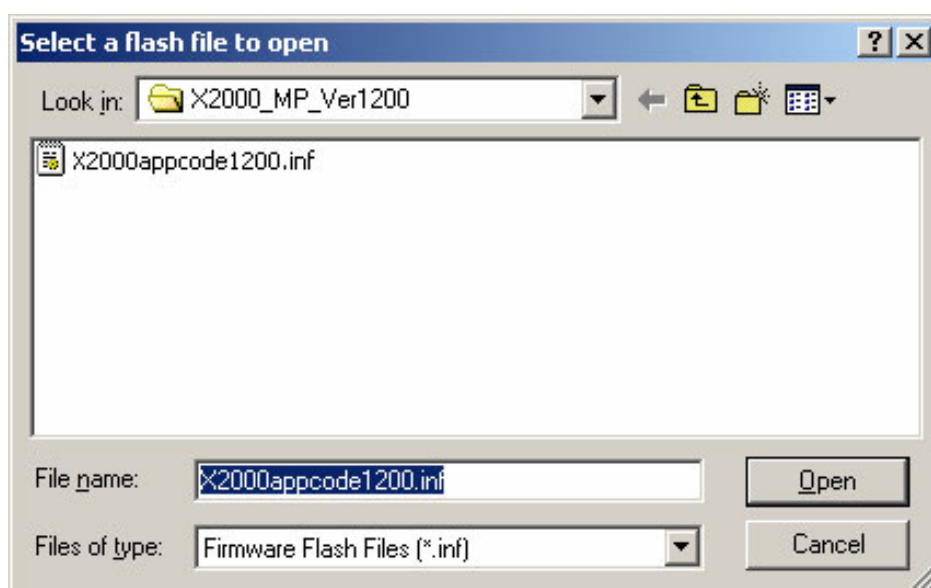
Then plug the RS232C connector on the other end of the cable into a RS232C port on the computer.

Open Windows Explorer navigate to the location where you stored the upgrade files, and then double click the **Firmware Upgrader.exe**.

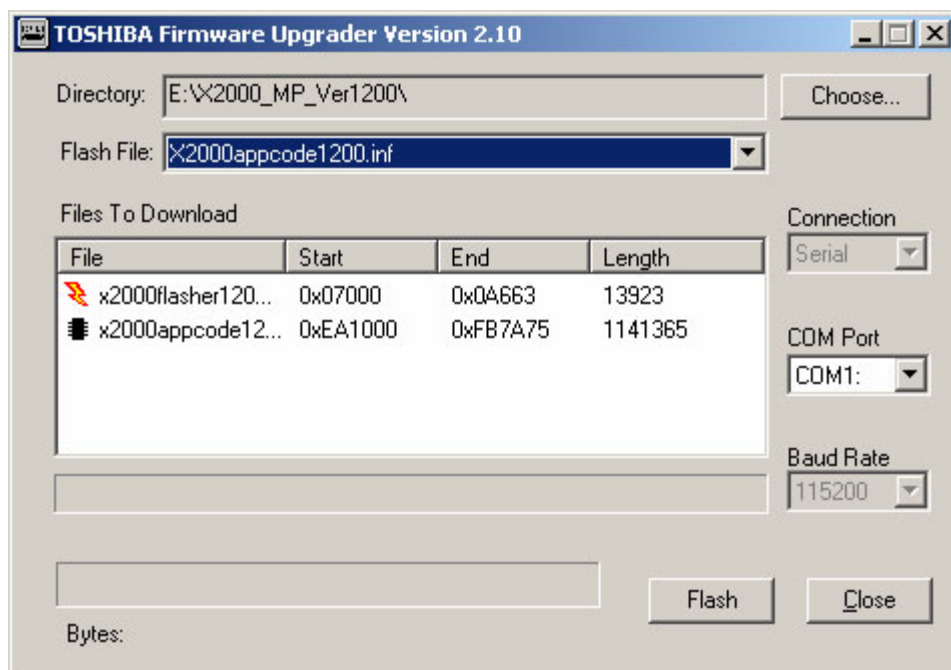
The Upgrade Wizard appears. Click the **Choose** button to open the Select File Dialog box.



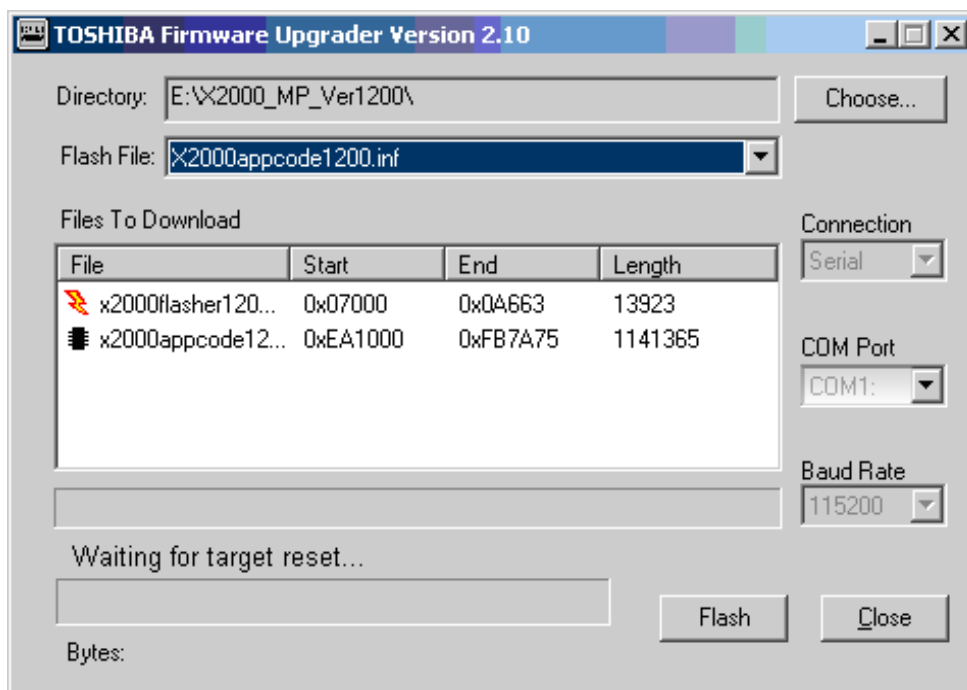
In the Open File dialog box, select the **.inf** file, and then click **Open** button.



The upgrade file appears in the Select File box.
Select the COM port.

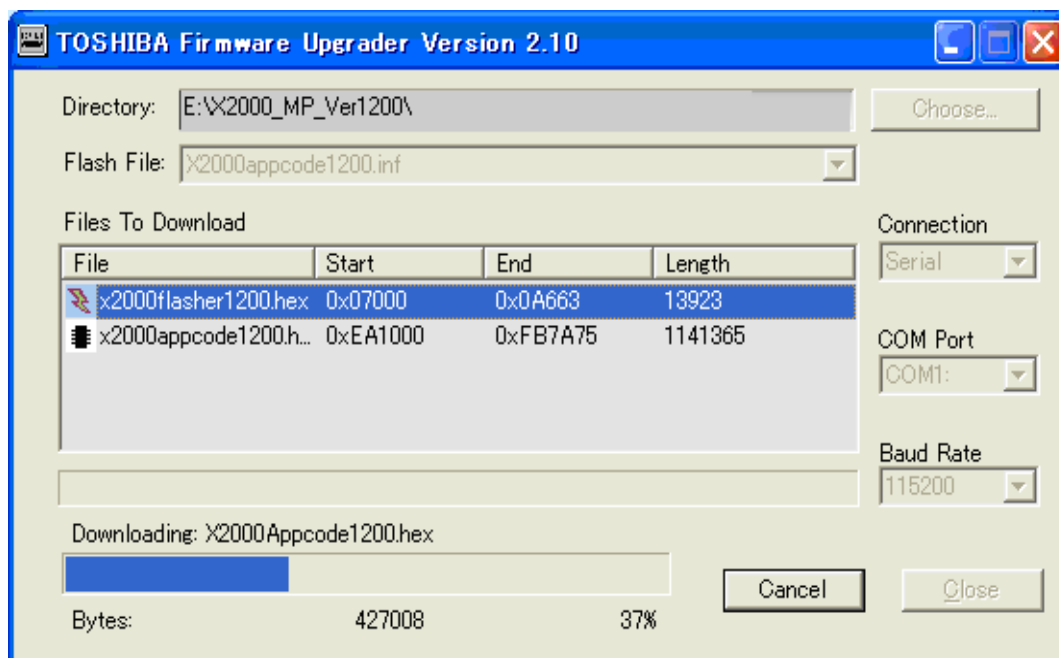


Click **Flash** button.



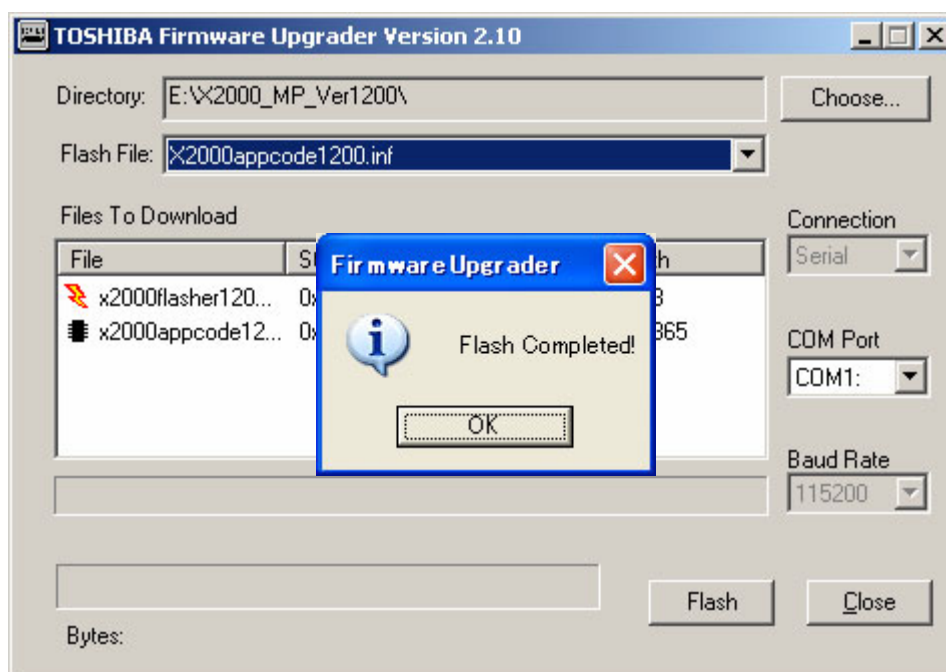
Press and hold the projector's **[Input]** and **[Keystone]** keys, and then plug in the power cord.

The projector starts the Firmware upgrade,
[LAMP], **[ON/Standby]** and **[TEMP]** LED's are RED blinking.



The computer begins downloading the upgrade files to the projector.
The process may take several minutes.

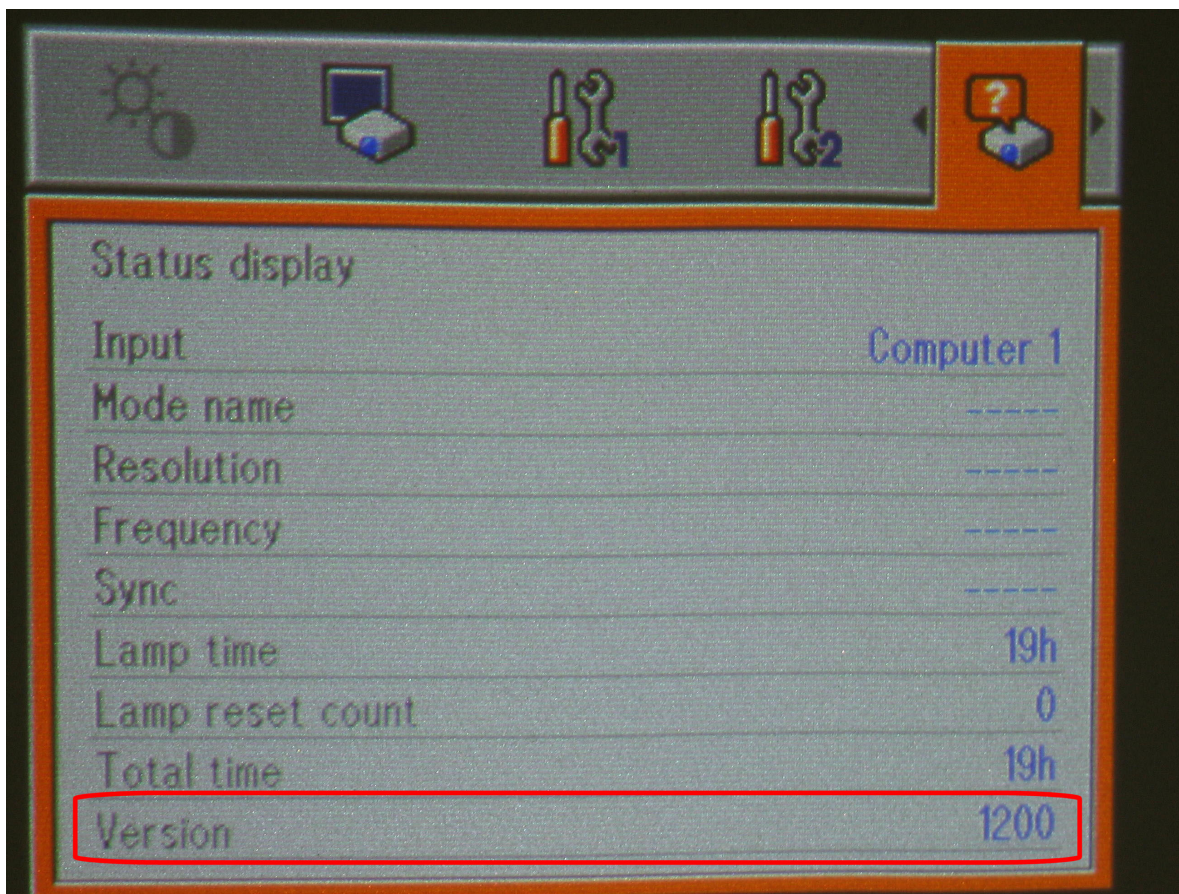
When the upgrade finishes normally, the following dialog box appears.



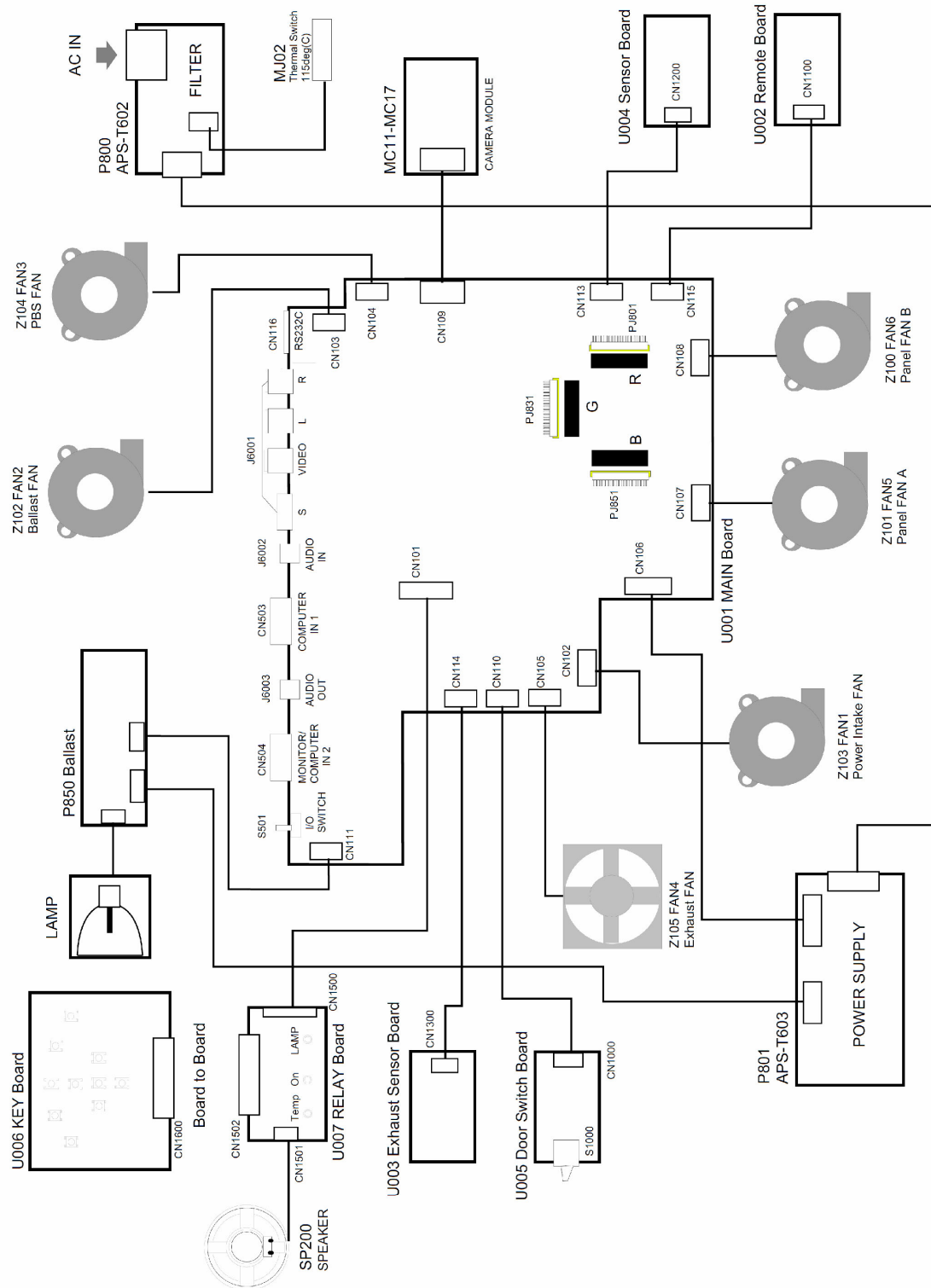
Click the **Close** button.
The upgrade is complete.

Confirm the software upgrade

1. Power up the projector.
2. On the projector keypad, press the MENU key to display the menus.
3. Press button Right or Left arrow to highlight Setting display.
4. The Setting display dialog box display the software version.
These should match the upgrade version you downloaded.

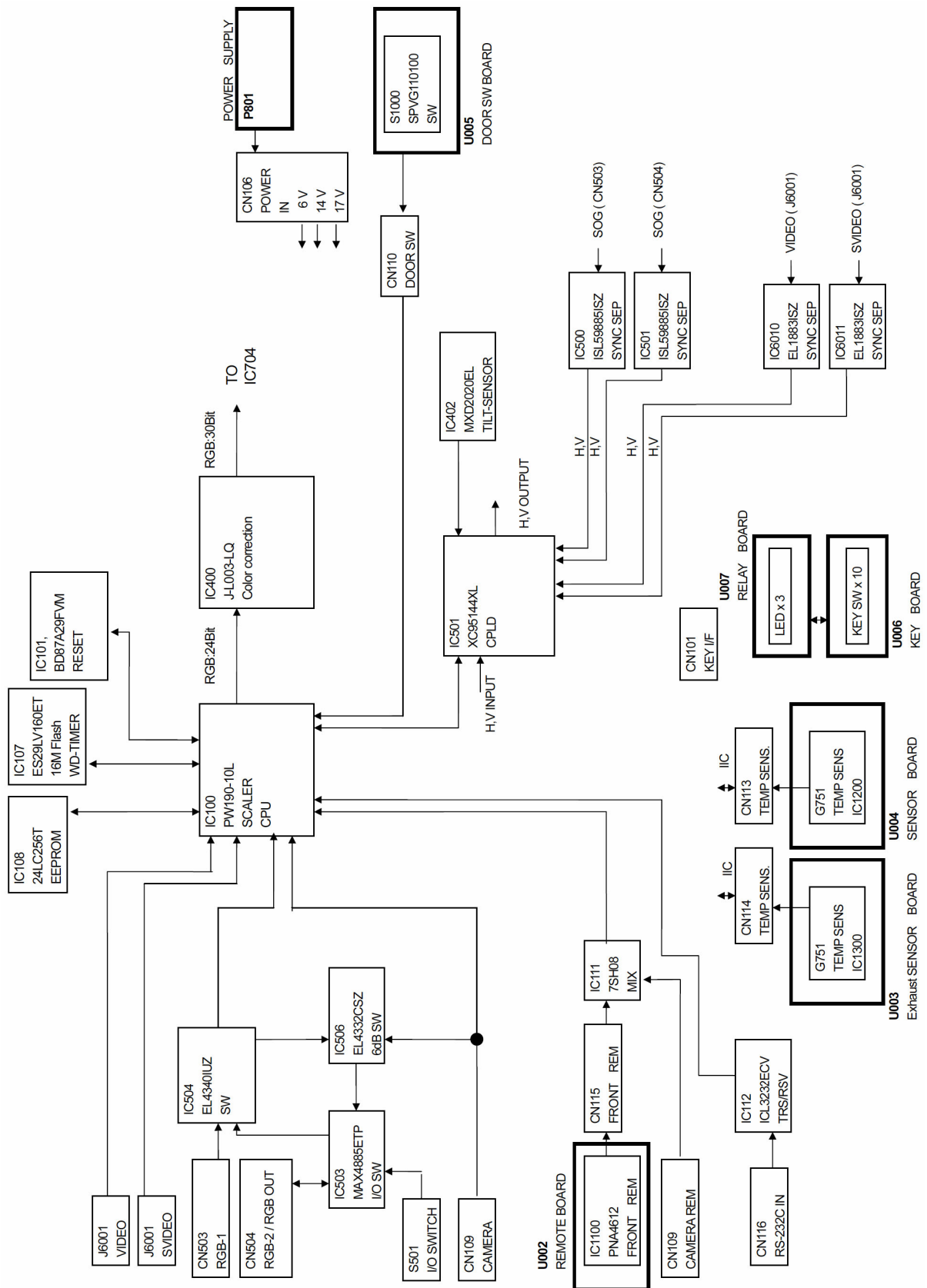


5-1

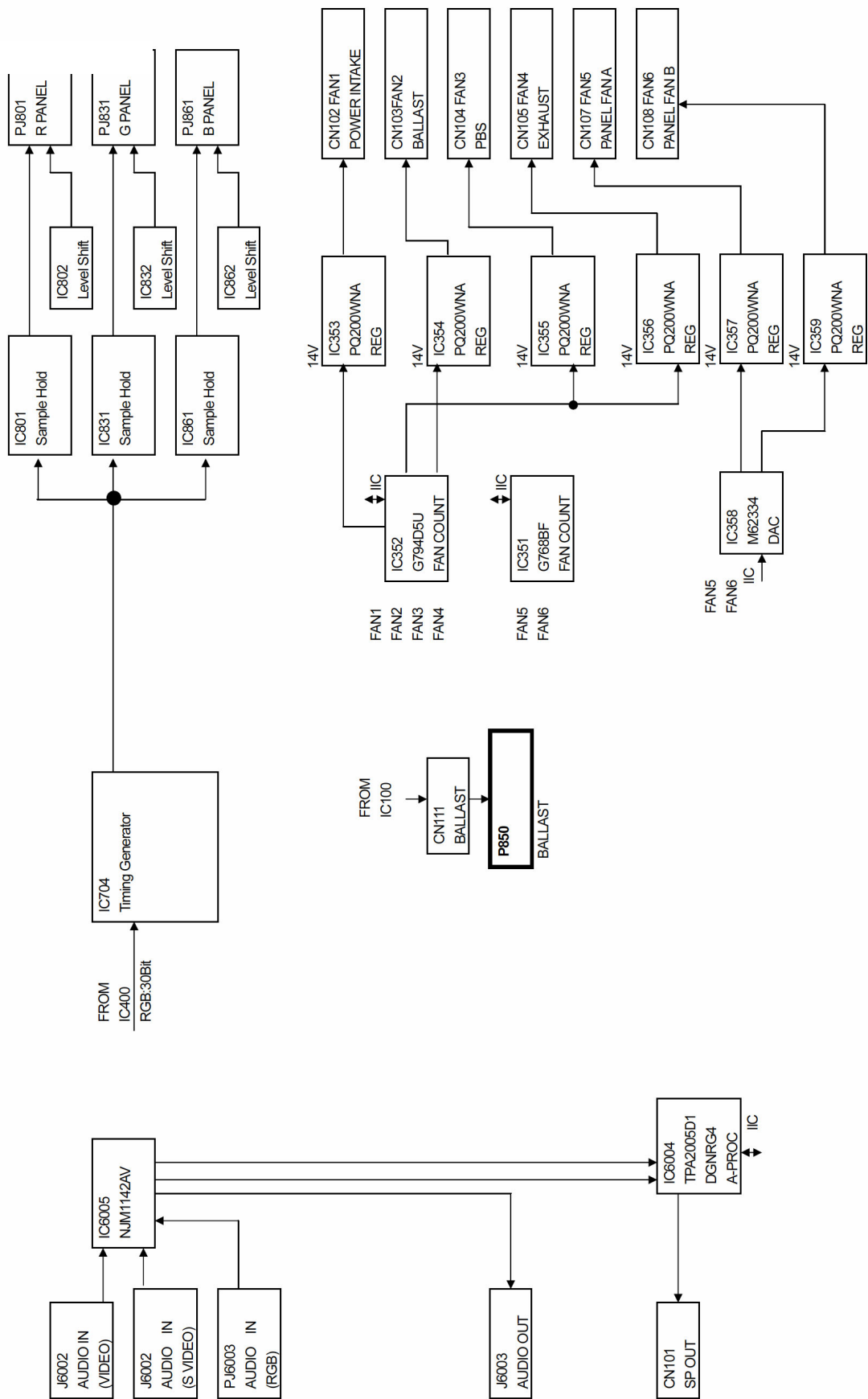


Block Diagram

BLOCK DIAGRAM 1/2
























Block Diagram 2/2



LED Display

LED Display (Problems Shown on LED Indicator Combination)

Error Code No.	Status of Indicator Lights	Trouble and Cause	Solution
-	  	[Standby power is not on] -> There's a problem with the power supply or the MAIN Board.	Check the power supply. Check the connector. Check the MAIN Board.
1	  	[Lamp error] Lamp went out during use, or won't come on. -> Lamp temperature is high or the lifetime of the lamp has ended or the projector is malfunctioning.	Unplug the power cord and wait for a short while, then turn the power back on. If the lamp burns out, replace it with a new one. Or it may have a trouble at ballast power supply. Or it may have a trouble at color wheel sensor or color wheel ribbon cable or MAIN Board.
2	   ORANGE flashing	[Lamp cover error] Power went out during use, or power won't come on. -> The lamp cover is not properly attached.	Unplug the power cord and reattach the lamp cover.
4 9	   GREEN flashing	[Fan error] Power went out during use. -> Problem with internal cooling fan or IC358(M62334), IC352(G794) and IC351(G768BF) don't reply to I2C commands or the MAIN Board does not read revolving pulse. <Error code> Distinction of "GREEN flashing" number of times 04:FAN1 Power Intake Fan (1time repeat) 05:FAN2 Ballast Fan (2times repeat) 06:FAN3 PBS Fan (3times repeat) 07:FAN4 Exhaust Fan (4times repeat) 08:FAN5 PANEL Fan A (5times repeat) 09:FAN6 PANEL Fan B (6times repeat)	Check the each cooling Fan. Check the MAIN Board.
10 15	   RED flashing	[Temperature error] Power went out during use. -> Internal overheating, or the outside temperature is too high or temperature sensor doesn't reply to I2C commands. <Error code> Distinction of "RED flashing" number of times 10: Intake temperature sensor (1time repeat) 11: Exhaust temperature sensor (2times repeat) 12: Temperature 3 (3times repeat) 13: Temperature 4 (4times repeat) 14: Temperature 5 (5times repeat) 15: Temperature 6 (6times repeat)	Place the projector so that the air intake and exhaust are not blocked. Unplug the power cord and wait for a short while, then turn the power back on. Check the each temperature sensor.
16	  	[Device error] Power went out during use. -> There are problems with the MAIN Board. <Error code> 16: NJM1141, 24LC128, G794, G768.. at MAIN Board.	Check the MAIN Board.
	   ORANGE flashing	[CAMERA error] Power went out during use. -> There are problems with the CAMERA Module. <Error code> 16: CAMERA Module	Check the CAMERA Module.

<Notes>

When each error occurs, after approx. one minute of abnormal display, the projector turns to the standby state waiting for internal cool down.

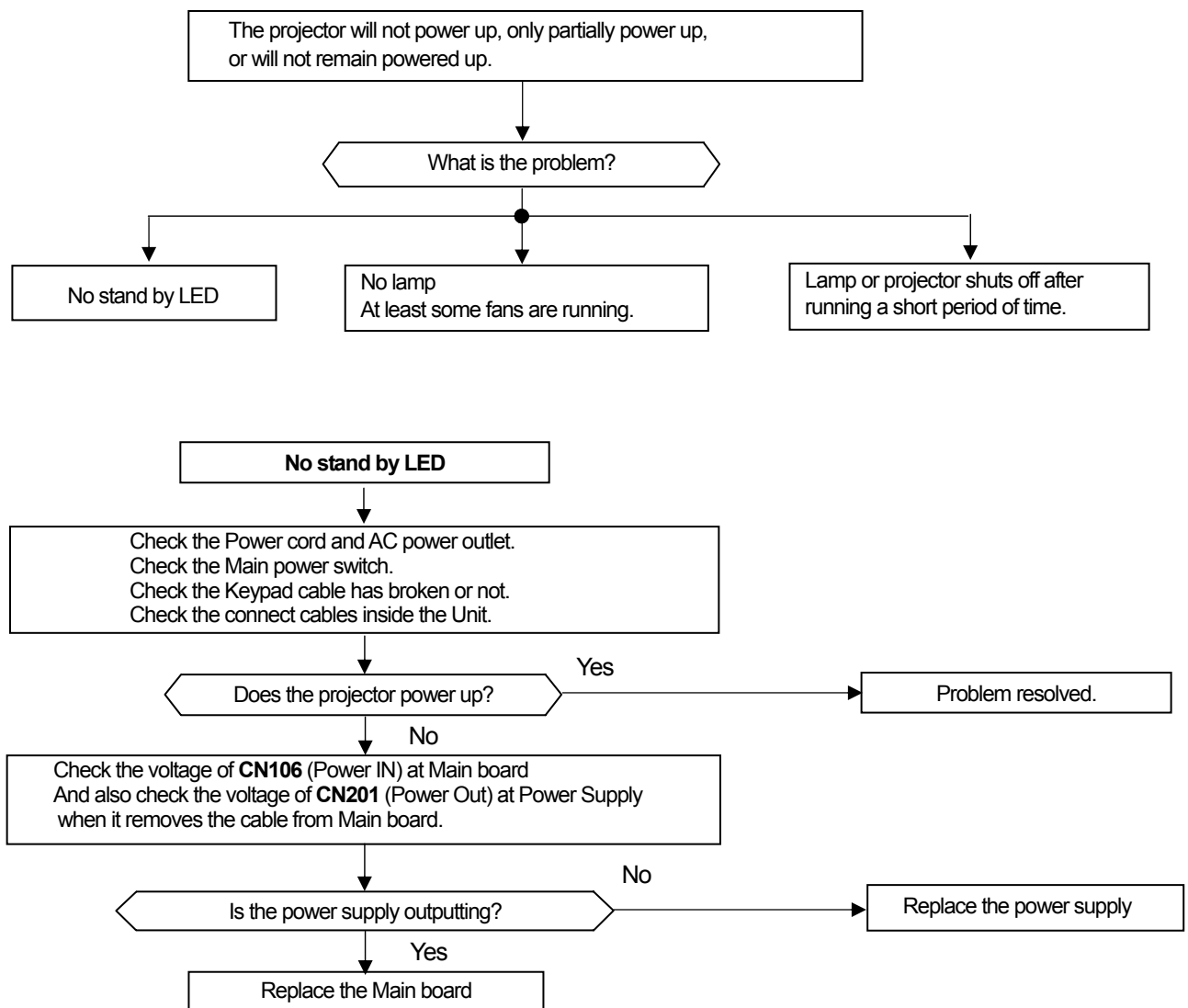
[L] : LAMP, [O] : ON, [T] : TEMP

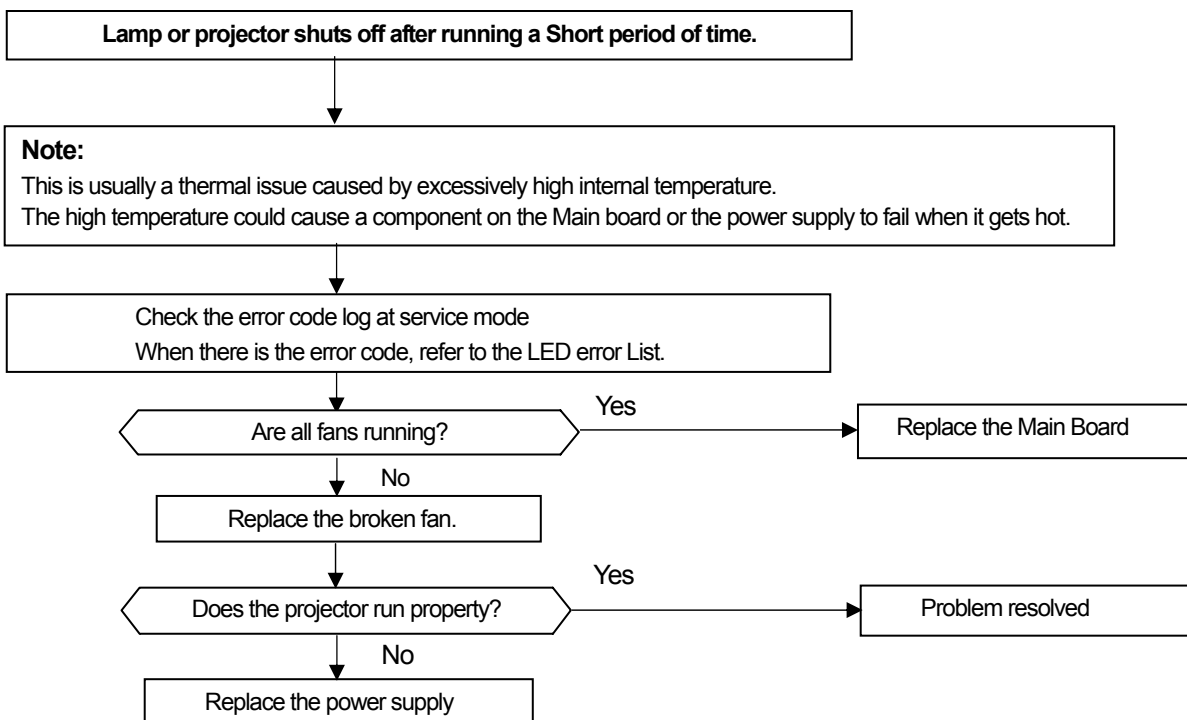
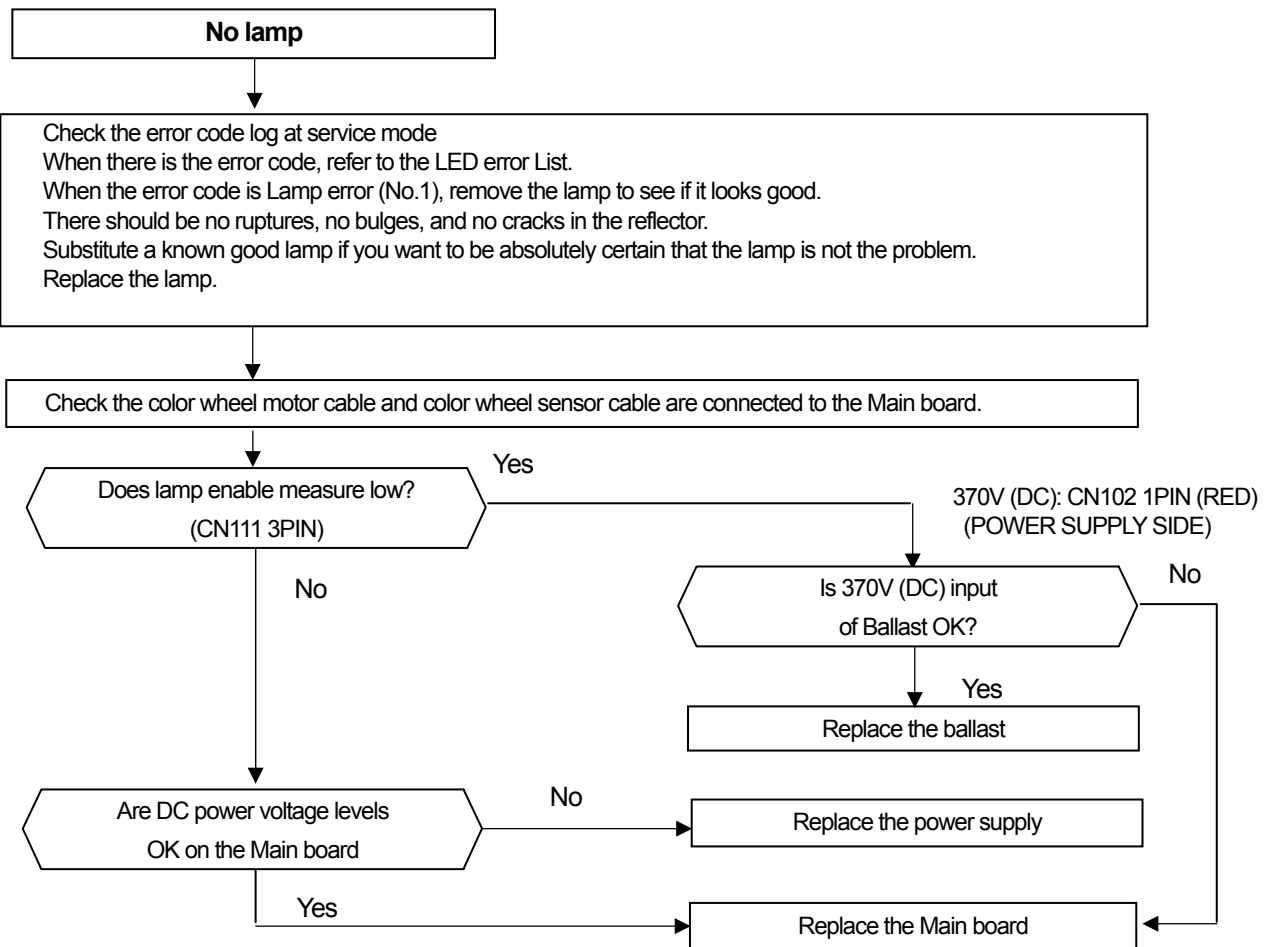
Troubleshooting

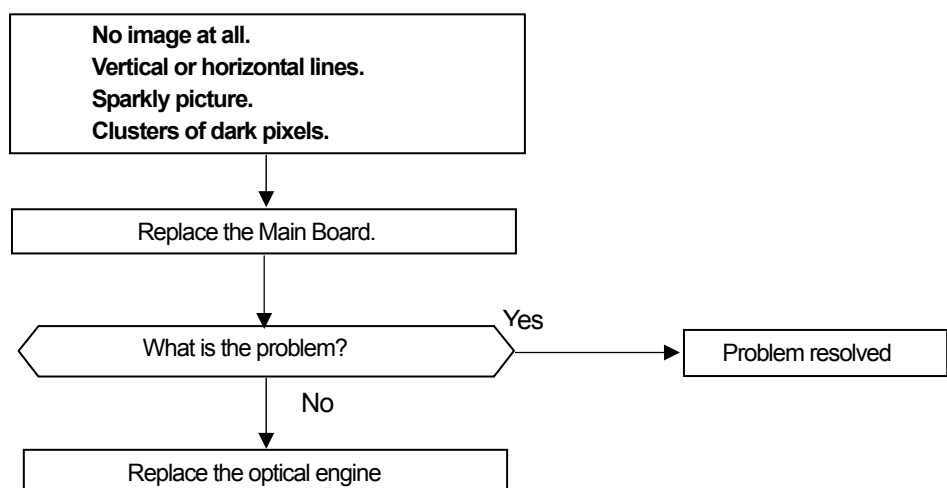
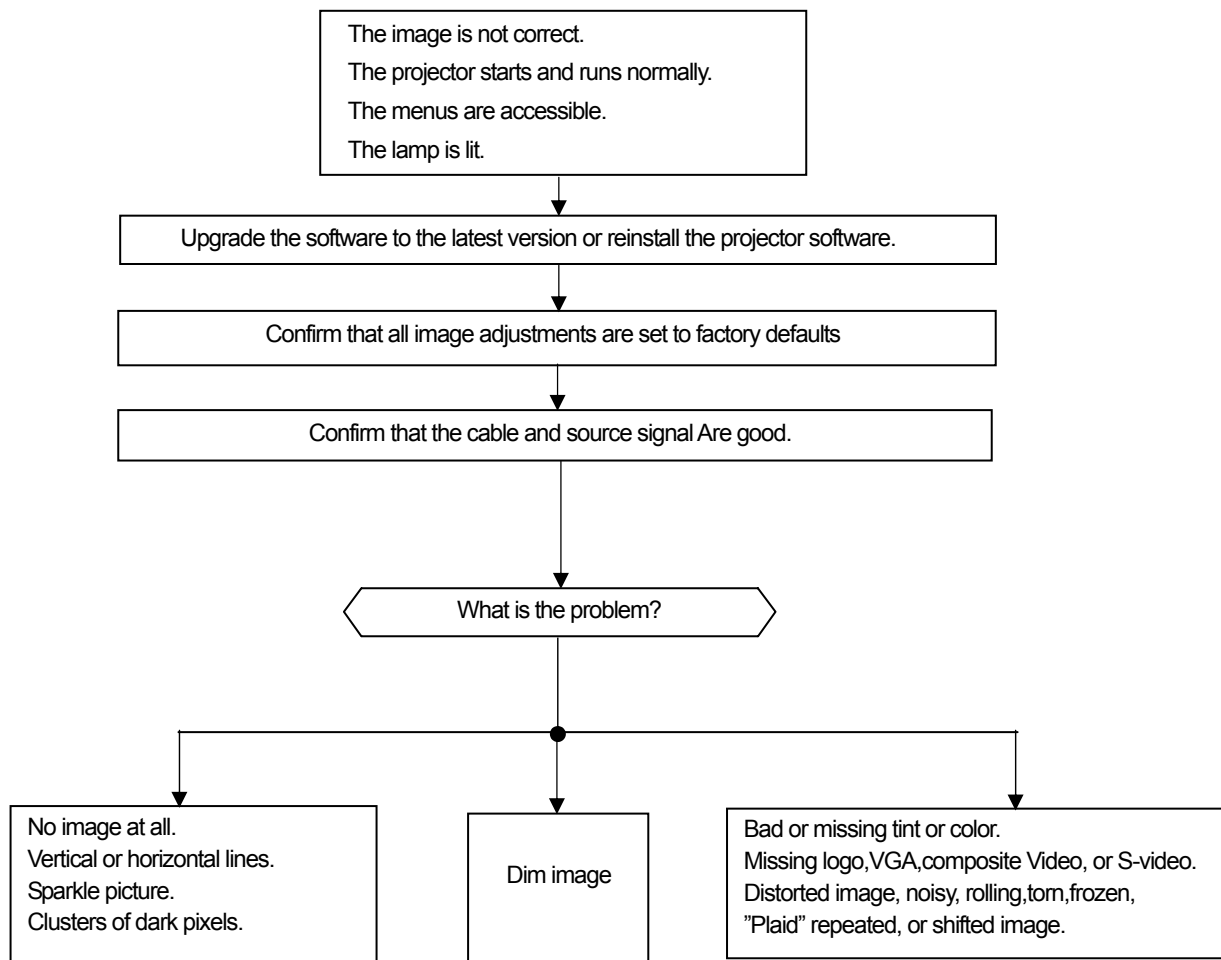
You use this section to diagnose problems with the projector. Choose the problem you are trying to diagnose from the list below. The Power, Image and Audio sections provide a variety of symptoms, while the other includes only one page.

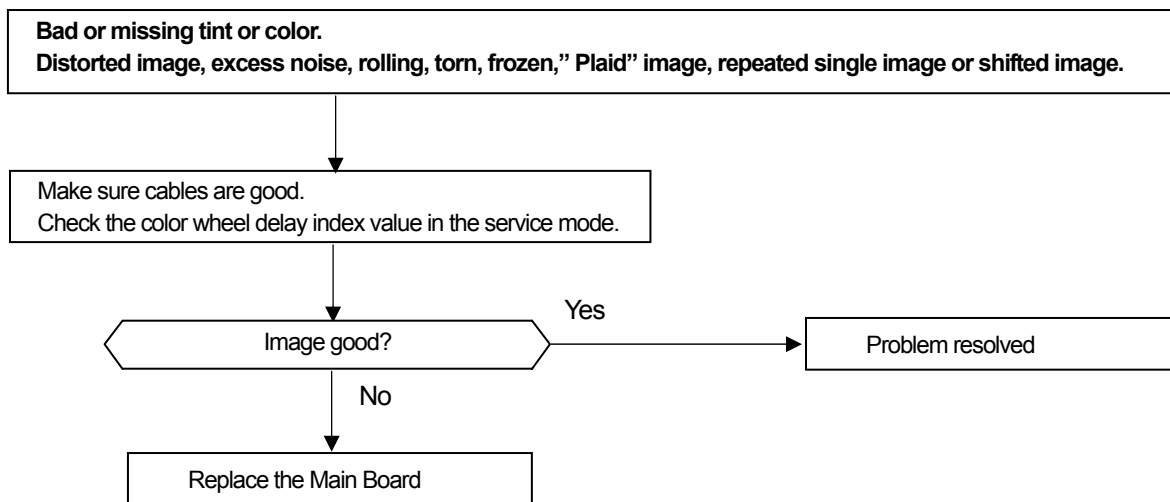
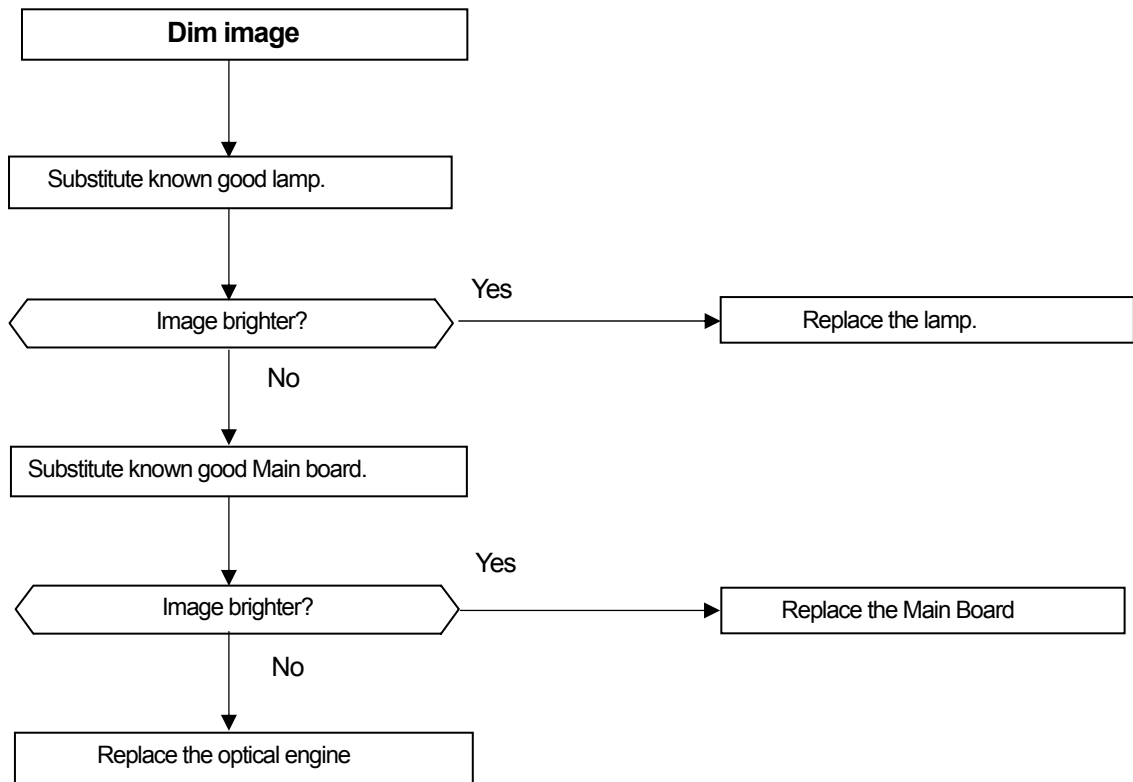
1. For Power problems
2. For Image problems
3. For Audio problems
4. For Remote Control
5. For Keypad problems
6. For Menu problems

Troubleshooting Power Problems





Troubleshooting Image Problems



Troubleshooting Audio Problems**No audio or distorted audio from the speaker.**

Make sure cables are good.

Is audio OK?

Yes

Problem resolved

No

What is the problem?

No audio from the speaker

Audio is distorted

No audio from the speaker.

Check the speaker resistance.

Does it measure around 16 ohms?

Yes

Connect a known good 16 ohms speaker in place of the existing speaker.

No

Replace the speaker

No

Is audio OK?

Yes

Replace the Main board.

Problem resolved

Audio sounds scratchy or distorted.

Verify that audio signal source and cables are good.

Sound good?

Yes

Problem resolved

No

Connect a known good 16 ohms speaker in the place of the existing speaker.

Sound good?

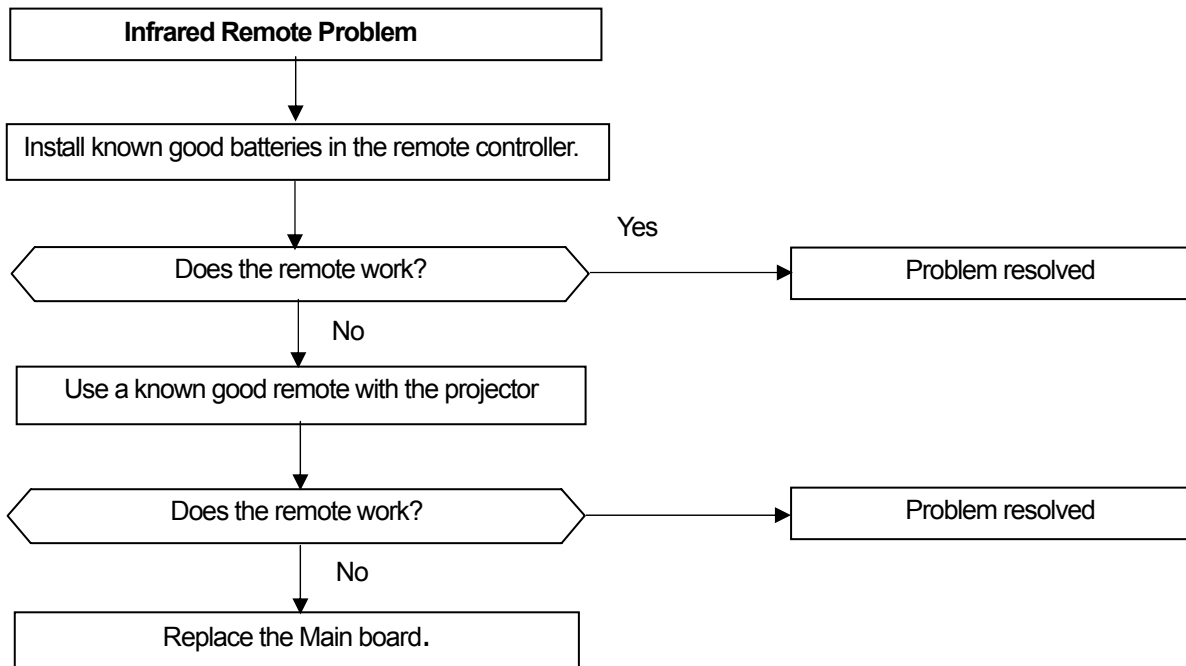
Yes

No

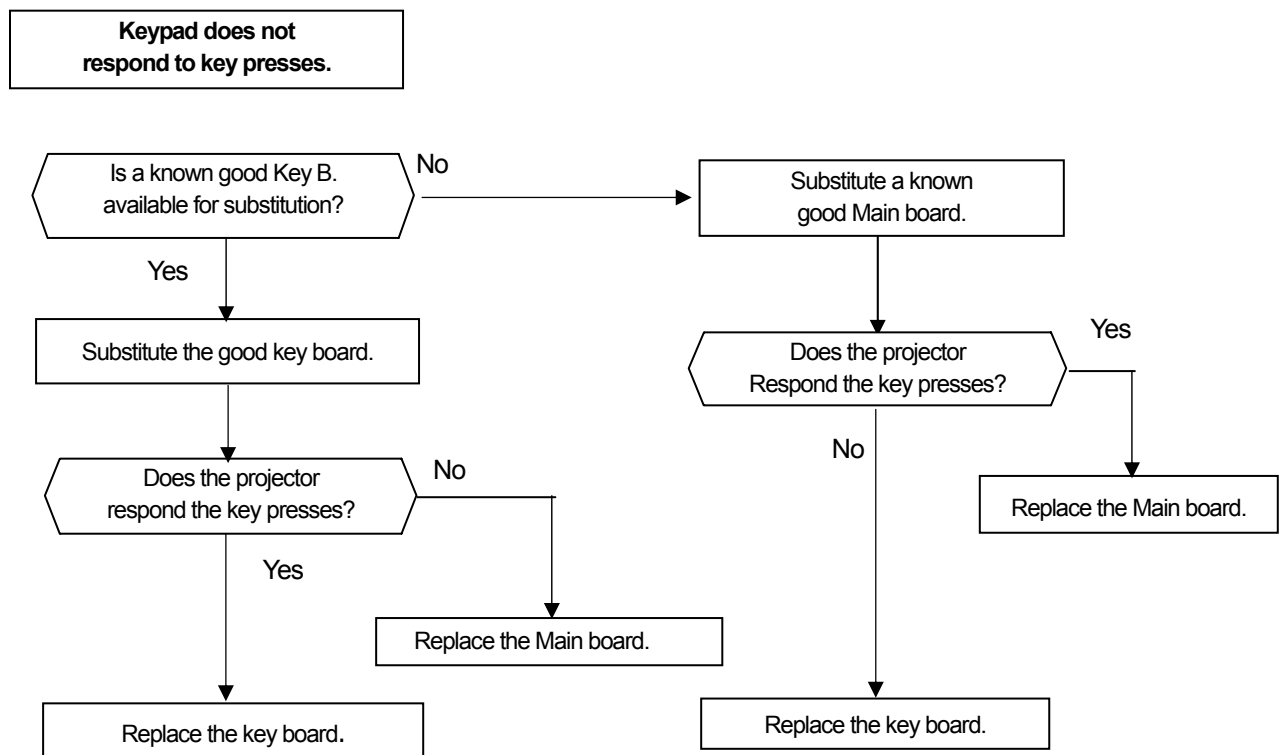
Replace the Main board.

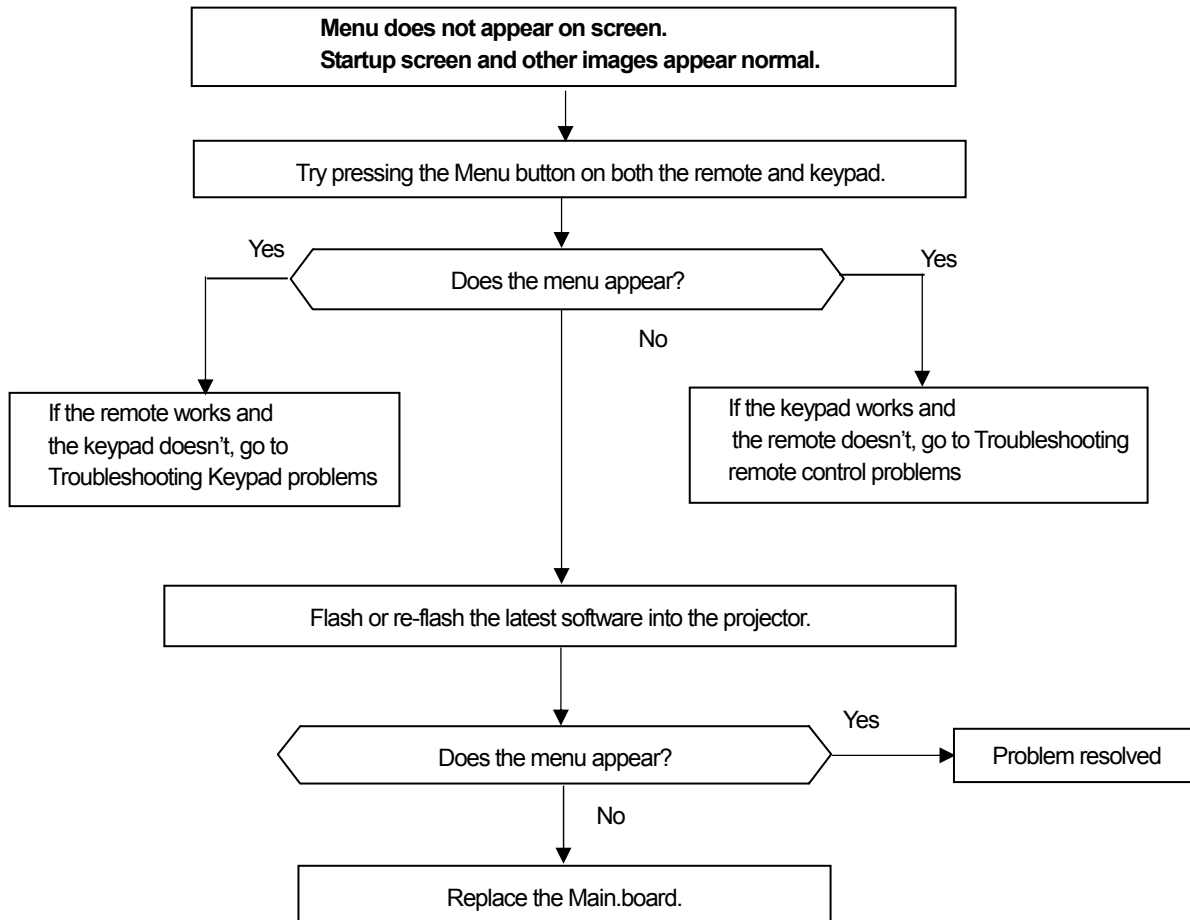
Problem resolved

Troubleshooting Remote Controller Problems



Troubleshooting Keypad Problems



Troubleshooting Menu Problems

Operation of Power Supply (APS-M602)

OUTLINE

This power circuit APS-T60 is composed of 2 units as shown as below. (Fig.1)

APS-T602 is composed of AC inlet and input line filters mainly.

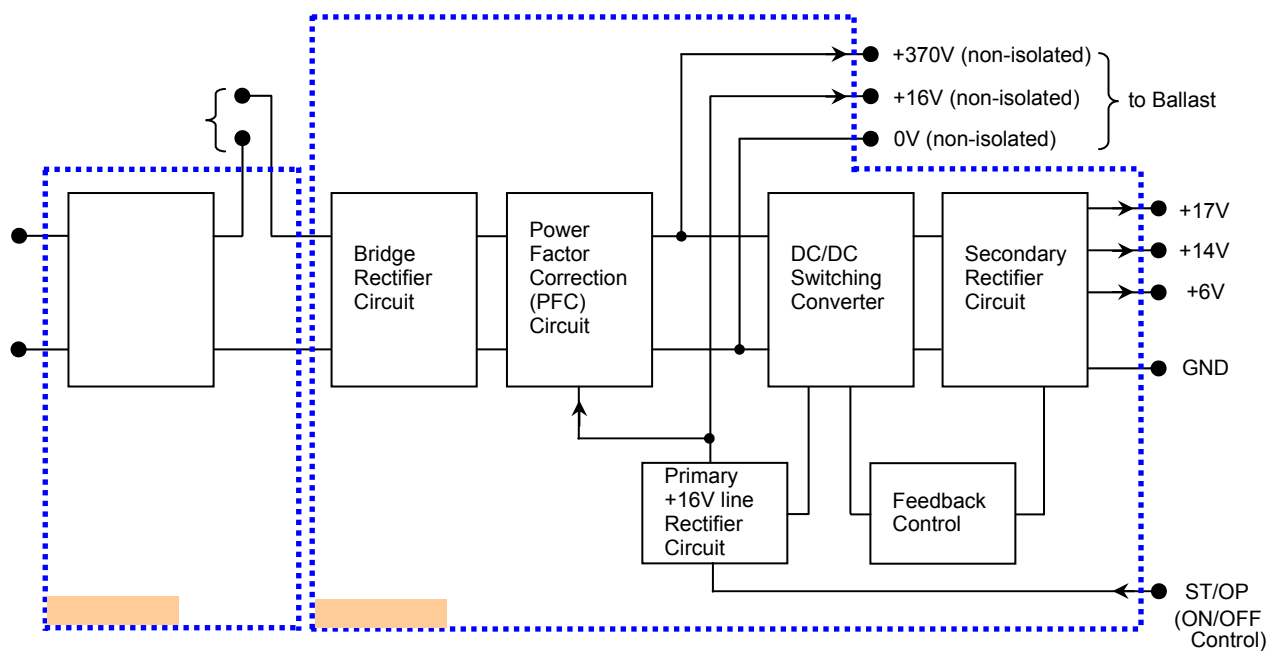
APS-T603 is composed of rectifier circuits, PFC circuit and DC/DC converter circuit mainly.

The power circuit APS-T60 is supplied 100~240Vac and it supplies 5 power sources to load circuits.

In case of the typical operation, it supplies 370V (260W max.) and 16V as Non-isolated output and supplies 3 outputs as isolated output. 3 isolated outputs are 6V, 14V and 17V.

In case of the standby mode, 16V line is turned off. And the voltage of 370V line is varied to voltage that

rectified the AC source. 3 isolated outputs are not turned off.



OPERATION OF POWER SUPPLY

1. Transition from AC ON to Standby mode

When the AC source is supplied to this power circuit, the voltage rectified by D101 and smoothed by C105 is supplied to VH pin of IC102 through R125.

VCC pin voltage of IC102 rises by current supplied to VCC pin through VH pin.

And then, IC102 starts up and the DC/DC converter begins to operate. (6V, 14V and 17V start up.)

* This DC/DC converter is a PWM switching circuit, which is composed of IC102, T201 and Q103 mainly.

2. Transition from Standby mode to Typical Operation mode

When the level of ST/OP pin in the connector CN201 is Low or open, only the DC/DC converter is in the switching operation. Each output does not have the on/off control which works solo, except primary 16V line. The voltage level of primary 370V line becomes voltage after smoothing through bridge rectifier circuit. (e.g. Input: 100Vac, Output: approx. 140Vdc)

This status is standby mode.

When the level of ST/OP pin in the connector CN201 is High, Q105 is turned on through a photo-coupler PC103, and then the primary 16V source is supplied to the Ballast and IC101 of PFC circuit.

Because VCC voltage of IC101 reaches threshold level of starting voltage, IC101 starts up activity and the PFC circuit begins to operate. The voltage level of primary 370V line becomes approximately 370V which is stable against variation of AC input voltage.

* ST/OP pin is a pin to control for switching mode between standby and typical operation.

3. Protection against abnormal condition

If Overvoltage or overheat or overload happens, the DC/DC converter stops the switching operation by putting IC102 into the latch mode. Every output (They are primary 16V, secondary 6V, 14V and 17V.) of the DC/DC converter is turned off, and this is maintained. PFC circuit stops the switching operation because +16V line which is power source for the control IC of PFC is turned off. The voltage of 370V line varies to voltage that rectified the AC source. (i.e. The boost stops.)

About the latch mode of IC102

In normal operation, CS pin voltage of IC102 is clamped by an inside 4V zener diode.

Externally forcing CS pin voltage to increase to the threshold voltage, 8.2V, for the latch mode allows the IC102 to stop its operation for protection.

When CS pin voltage reaches to 8.2V, the inside source in IC102 is turned off, and OUT pin (for gate drive of FET in the DC/DC converter) is set to the Low level.

Then, the start-up circuit is activated again, and VCC voltage is held at approximately 22V. This status is the latch mode of IC102. The latch mode is maintained as long as supply to VCC pin continues.

It takes time for the latch mode to be rest because charged C105 voltage is applied to the VH pin even if IC102 have changed to the latch mode.

Cutting off the input voltage decreases VH pin voltage, supplying no current to the VCC pin.

Thereafter, the latch mode is reset when VCC drops below the OFF threshold level, 8V min.

OPERATION OF EACH SECTION

1. Input Line Filter

The Input line filter circuit is made up of capacitors (e.g. C1, C2, C101) and inductor chokes (e.g. L1, L2, L101) on APS-T602 unit and a part of APS-T603 unit,

This section protects the noise generated by the power supply circuit from leaking out to AC line and from entering of the external noise inside the power supply circuit.

This circuit is effective for both normal and common noise.

The fuse F1 becomes open in order to protect other parts, when excessive current flows in abnormal conditions.

The connector CN2 is connected to thermal sensing element (e.g. thermal protector). Power Supply is operated by CN2 shorted condition. In other words, when 2 terminals of CN2 become open by thermal protector, power supply to subsequent circuit is shut off.

2. Power Factor Correction Circuit (PFC circuit)

The main parts of this switching converter are choke coil T101, switching MOSFET Q101, Q102, control IC IC101 and diode D104. This circuit has mainly 4 functions as following.

a. Generate stable voltage

This PFC circuit operates so that the output always is set to 370Vdc(typ.). Actually, the switching operation of Q101 and Q102 is controlled by IC101. Initial voltage setting of 370V output is set at 370Vdc(typ.) by VR101. (Input voltage: 100Vac, maximum load)

* Please don't turn although there are 2 variable resistors for this output voltage setup and for the overvoltage protection setup. The case which needs to turn the volume means that the failure mode cannot be repaired easily.

b. Reduce input harmonic current

Main purpose of Power Factor Correction Circuit is reducing input harmonic current by bringing the input current waveform closer to a sine wave.

This circuit is CCM (Continuous Conduction Mode) PFC circuit which used resettable integrator.

The gate pulse width is adjusted per one cycle by detecting DC output voltage at the VF pin of IC101 and peak current at the ISNS pin of IC101. The amplitude and shape of the input current is controlled so as to be proportional to and in phase with the input voltage.

c. Over current protection

The current sense pin ISNS of IC101 is the input to the current sense amplifier and the overcurrent protection comparator.

There are essentially two levels of current limitation provided by the IC101. There is a "soft" current limit, which is essentially a duty cycle limiting fold back type: the converter duty cycle is limited to the point where output power is limited and the output voltage begins to decrease. There is also a "peak" current limit feature which immediately terminates the present drive pulse once the peak limit threshold, = -1.0V, is exceeded.

d. Over voltage protection

The voltage in proportion to output voltage by resistors R112, R113, R114, R115 and VR102 is added to the OVP pin of IC101. When the OVP threshold(7.49V(typ.)) is triggered, the IC101 will disable the gate drive signal.

3. DC/DC converter

The main parts of this switching converter are transformer T201, switching MOSFET Q103, control IC IC102 and output diodes D201, D202 and D203. This converter is Fly Back type.

This means that energy is transferred from the primary to secondary when MOSFET Q103 is off.

The main output is 6V line and auxiliary output is 14V and 17V line.

a. Start up

When AC input is supplied to this power supply unit, power source of IC102 is supplied through R125.

And then IC102 begins switching operation and the converter starts up.

Once the converter starts up, power source of IC102 is supplied from auxiliary winding of T201.

b. Output Voltage Control

Output voltage is controlled by Pulse Width Modulation (PWM).

The voltage divided by R208, R209, R210 and R223 in the 6V line is detected, and this voltage is compared with the reference voltage of shunt regulator IC201. Photo coupler PC101 feeds back the comparison from secondary to primary. And output voltage is adjusted by the level of current drawn from the FB pin of IC102.

When 6V output voltage is above the control level, IC102 to shorten the on-time (duty cycle) of MOSFET Q103. This cause the average output to decrease. When the output is below the control level, on-time (duty cycle) is increase, thereby increasing the average output voltage.

c. Overcurrent Protection

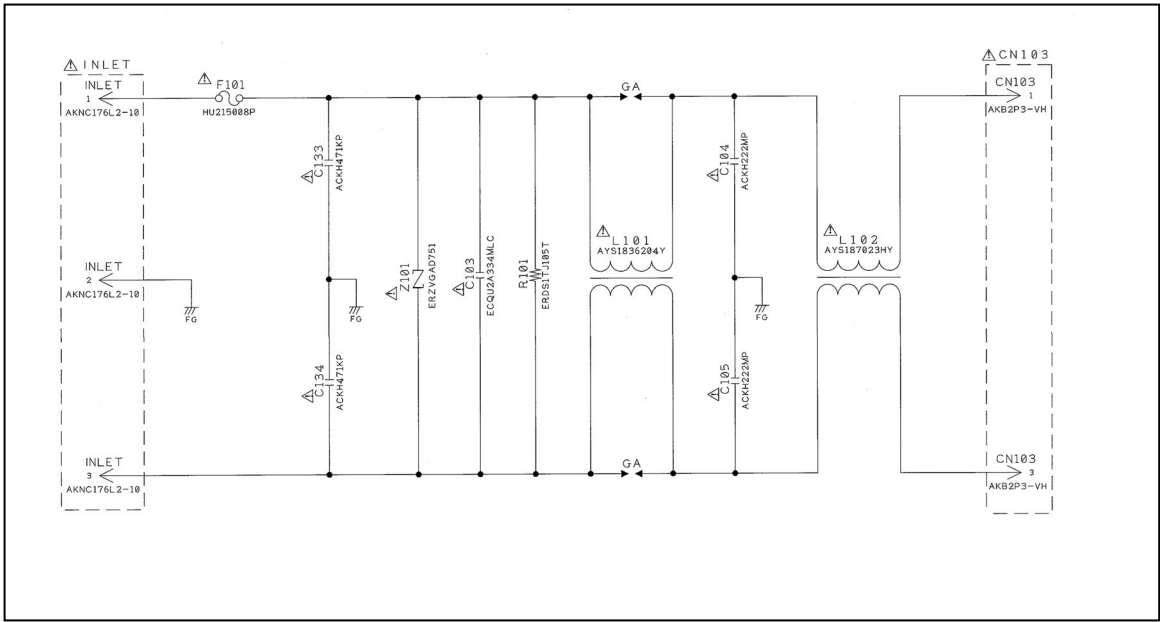
If the power supply output becomes overload, the current of MOSFET Q103 is limited by the maximum threshold voltage of the IS pin in IC102 and output voltage drops. If the state continues as it is, an overload protection function of IC102 operates to stop the IC in the latch mode.

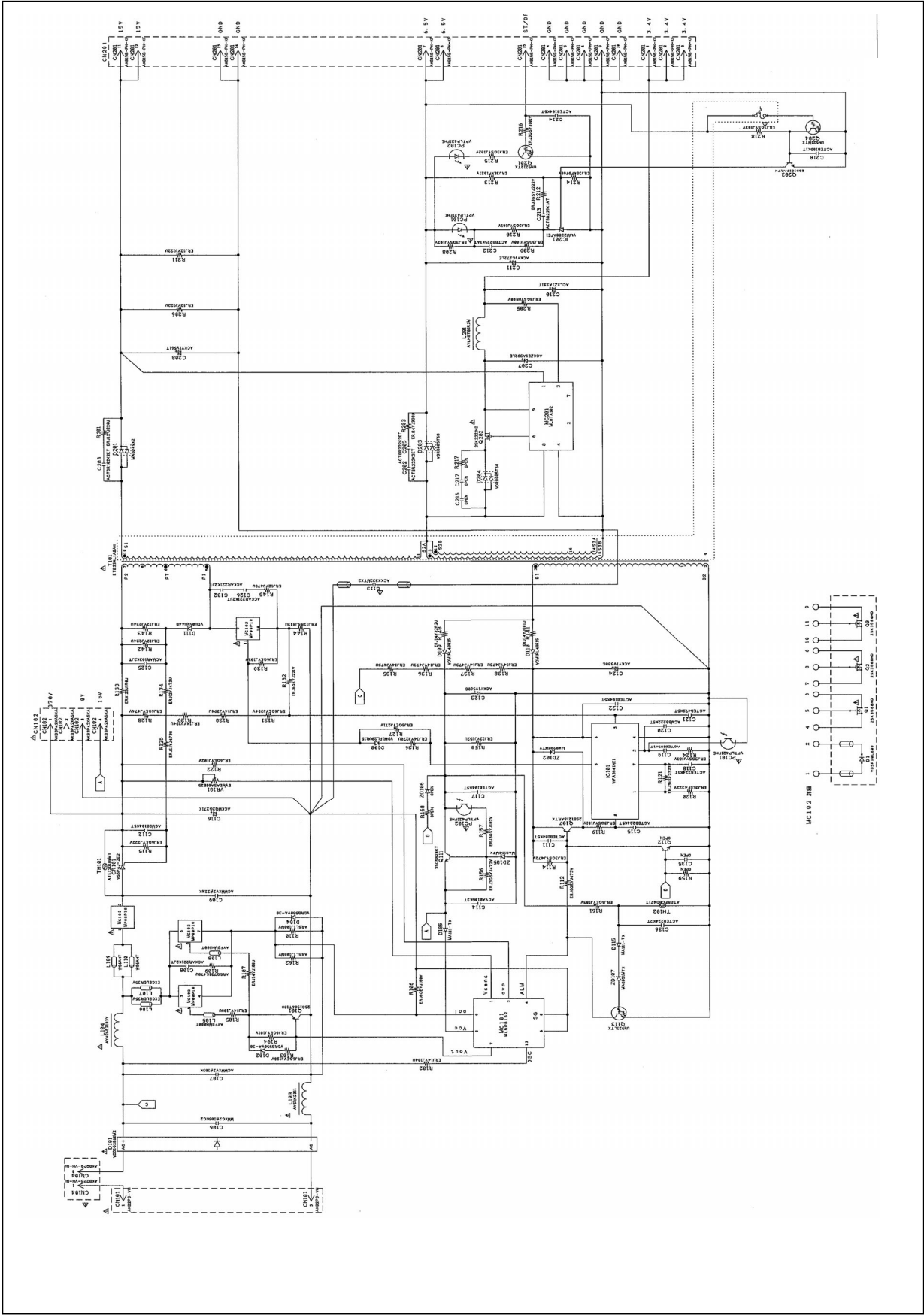
d. Overvoltage Protection

Overvoltage state is detected when output voltage exceeds the zener voltage of zener diode (ZD201, ZD202, ZD203). When zener diode is in conduction state, through the photo coupler PC102, the CS pin voltage of IC102 is increased forcibly to the threshold level for the latch mode. And power supply is shut down.

e. Overheat Protection

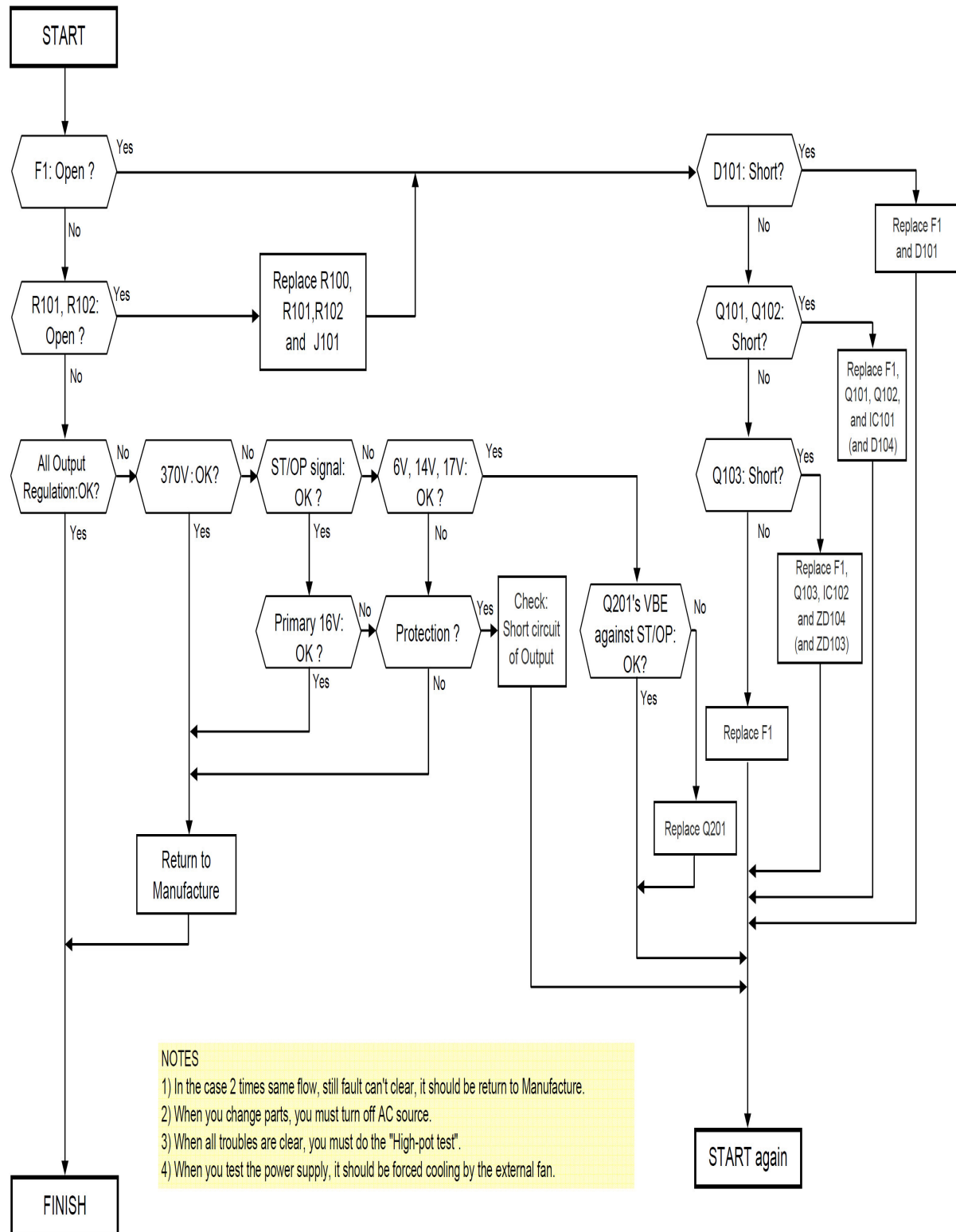
The abnormality of heat sink temperature of Q101, Q102 and Q103 is detected by PTC thermistor PR101. Through the diode D113, the CS pin voltage of IC102 is increased forcibly to the threshold level for the latch mode and power supply is shut down. It operates at the time of abnormal state such as overload or FAN-Locked.





APS-M602 (ETXTS602MDA/MDE) Troubleshooting Faults

TROUBLESHOOTING



Electrical Adjustment

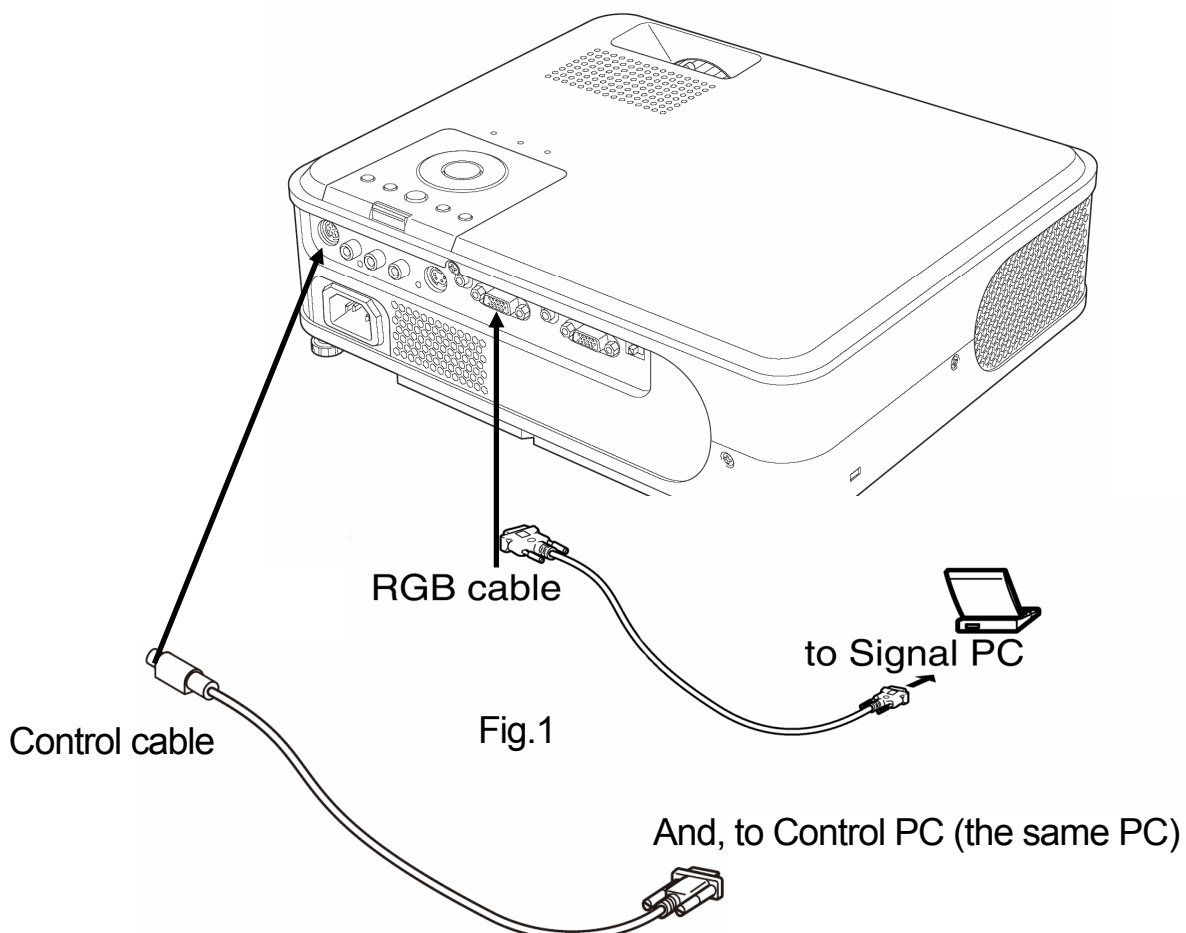
Preparation

< Test equipment >

- 1) Personal computer
(Windows PC, OS: Windows 98SE, ME, 2000, XP)
- 2) Signal generating software
SINGOWS2000.MSI (Installer)
- 3) Adjustment software
DPJAdjustmentTool_2500.exe
- 4) Cables
RGB Cable and Control (RS232C) Cable
- 5) A protractor for Vertical Auto Keystone Calibration

<For connection and setting of Personal computer>

- 1) Connection of personal computer
Connect the PC to computer 1 input and RS232C terminal as shown in following Fig.1
- 2) Set the screen resolution and refresh rate to XGA (1024x768) 60Hertz.
Set RGB output of the PC to CRT.



Adjustment Points vs Part Replaced

The table below shows you the items to be adjusted according to the type of part you replaced.

Adjustment Parts	Keystone	Sub Contrast	Altitude	Pixel (Convergence)	VCOM	Gamma	Shading
	Special Key Operations			SINGOWS 2000	DPJAdjustmentTool_2500.exe		
Main Board	○	○	○	×	○	○	○
Optical Engine	×	×	×	×	○	○	○
LCD Panel	×	×	×	○	○	○	○

○ :Adjustment is needed

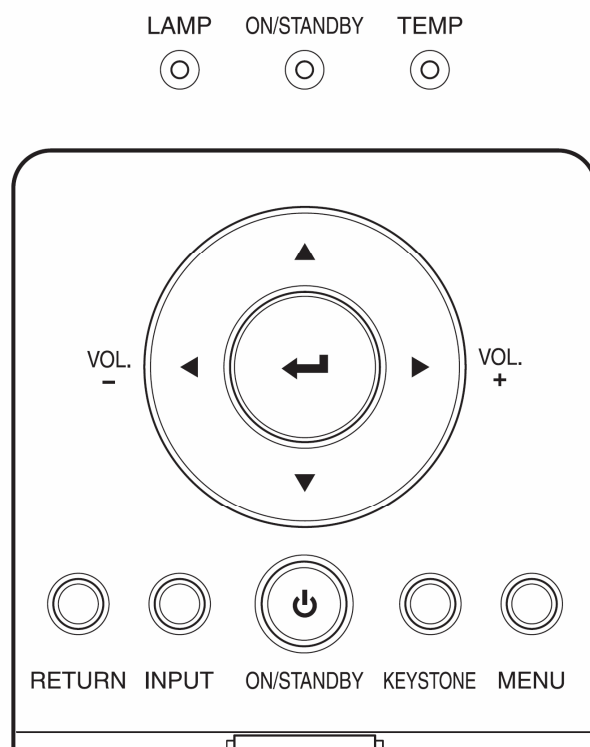
× :Not necessary

<SAVE DATA to EEPROM > (Common on all adjustment)

Press the buttons,

[Up], **[Down]**, **[Left]** and **[Right]** simultaneously.

When these buttons are accepted, all LED's light orange or red blinking in order.



Projector Setup

Plug in the power cord; turn on main power switch and the power of the projector.

How to enter to the Factory Mode (TLP-X2500/XC2500/X3000/XC3000)

- 1) While the Volume adjustment bar is displayed on the screen, set value to **[2]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.
- 2) While the Volume adjustment bar is displayed on the screen, set value to **[0]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.
- 3) While the Volume adjustment bar is displayed on the screen, set value to **[0]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.
- 4) While the Volume adjustment bar is displayed on the screen, set value to **[0]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.

When the projector enters to the Service Mode, the buzzer beeps for 3 seconds.

If doesn't beep, repeat from the beginning.

This mode maintains until you turn off the main power switch.

How to display the Service status

After the projector has entered to the factory mode, press the buttons, **[Return]** and **[Up]** simultaneously. Then, the following display appears.

If it doesn't appear, repeat from the beginning.

This mode maintains until you turn off the Main power switch.

Service status (Display only)				[RETURN] Quit			
Version				1200			
User lamp time		1H - 10M - 10S		-> Reset count		0	
Total time		1H - 10M - 10S					
LCD Panel time (R)		1H - 10M - 10S		-> Reset count		0	
LCD Panel time (G)		1H - 10M - 10S		-> Reset count		0	
LCD Panel time (B)		1H - 10M - 10S		-> Reset count		0	
Polarizer time (R)		1H - 10M - 10S		-> Reset count		0	
Polarizer time (G)		1H - 10M - 10S		-> Reset count		0	
Polarizer time (B)		1H - 10M - 10S		-> Reset count		0	
KC0	28 - 4786 - 2423		KC1	27 - 4799 - 2664			
KC2	27 - 4809 - 2005		KC3	26 - 4331 - 2440			
Sub contrast (Com1)		46 - 38 - 46		Sub contrast (Com2)		51 - 42 - 51	
Fan-1	2874rpm	Fan-2	2808rpm	Fan-3	5120rpm		
Fan-4	2656rpm	Fan-5	5173rpm	Fan-6	4964rpm		
Temp-1	25deg	Temp-2	60deg	Temp-3	0deg		
Temp-4	0deg	Temp-5	0deg	Temp-6	0deg		
Engine No.		000AAA00000A-R		Altitude		0	
Error count				0		Shut down	
Error log				0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0			
Serial No.				63731126		Model name	
[Total time] display				Enable		[Password] function	
[Lamp Msg] display				Enable		[Filter Msg] display	
						Enable	

FAN-1 is Z103 (Service part location No.). **FAN-2** is Z102.

FAN-3 is Z104. **FAN-4** is Z105. **FAN-5** is Z101. **FAN-6** is Z100.

Temp-1 is Intake temperature. **Temp-2** is Exhaust temperature.

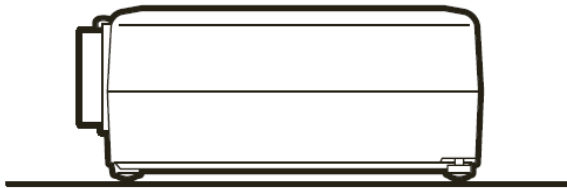
A number of **Error log** means an error ID.

<Keystone Calibration>

Press **[Input]** and **[Up]** buttons simultaneously.
For it initialize the value, Press **[Keystone]** button.

KC0	0	0	0
KC1	0	0	0
KC2	0	0	0
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute		[RETURN] Quit	

Set the projector on a level surface.



Press **[Enter]** button of the projector.

When the adjustment is successfully completed, values changes from default [0].

(**Example:** The following menu)

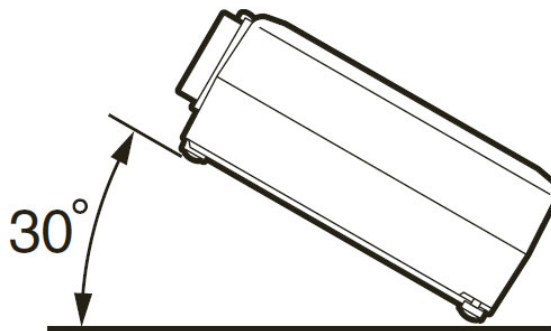
If it fails, values don't change from default [0].

KC0	28	4786	2423
KC1	0	0	0
KC2	0	0	0
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute		[RETURN] Quit	

Select the **KC1** item by pressing **[Down]** button.

KC0	28	4786	2423
KC1	0	0	0
KC2	0	0	0
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute [RETURN] Quit			

Keep projector on 30 degree.



Press **[Enter]** button of the projector.

When the adjustment is successfully completed, values changes from default [0].

(Example: The following menu)

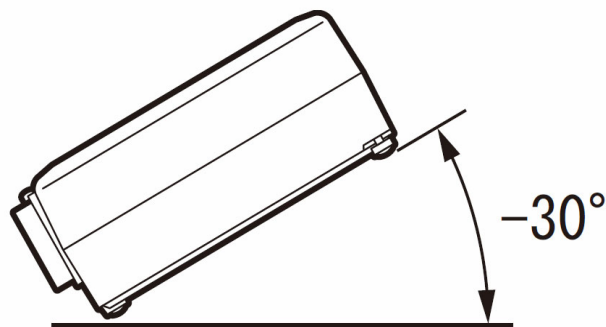
If it fails, values don't change from default [0].

KC0	28	4786	2423
KC1	27	4799	2664
KC2	0	0	0
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute [RETURN] Quit			

Select the **KC2** item by pressing **[Down]** button.

KC0	28	4786	2423
KC1	27	4799	2664
KC2	0	0	0
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute		[RETURN] Quit	

Keep projector on -30 degree



Press **[Enter]** button of the projector.

When the adjustment is successfully completed, values changes from default [0].

(Example: The following menu)

If it fails, values don't change from default [0].

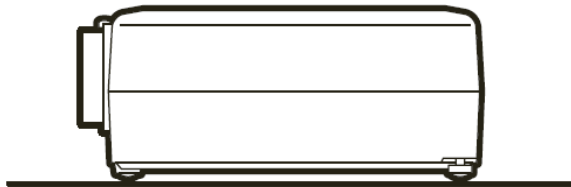
KC0	28	4786	2423
KC1	27	4799	2664
KC2	27	4809	2005
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute		[RETURN] Quit	

<Note> When the projector is not tilted accurately +/- 30degree,
the adjustment values (**[KC1]** and **[KC2]**) do not change.

Select the **KC3** item by pressing **[Down]** button.

KC0	28	4786	2423
KC1	27	4799	2664
KC2	27	4809	2005
KC3	0	0	0
Sub contrast	85	85	85
[ENTER] Execute		[RETURN] Quit	

Set the projector on a level surface and perform heat-run for 30 minutes or more.



Press **[Enter]** button of the projector.

When the adjustment is successfully completed, values changes from default [0].

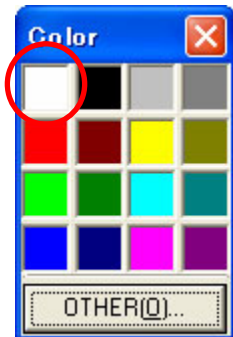
(**Example:** The following menu)

KC0	28	4786	2423
KC1	27	4799	2664
KC2	27	4809	2005
KC3	26	4331	2440
Sub contrast	85	85	85
[ENTER] Execute		[RETURN] Quit	

<Sub Contrast>

Right - click to display the following color pallets. Click **[White]** button.

Note: Move the mouse cursor out of a screen to avoid the error.



Select the Sub contrast item by pressing **[Down]** button.

Press **[Enter]** button of the projector.

KC0	28	4786	2423
KC1	27	4799	2664
KC2	27	4809	2005
KC3	26	4331	2440
Sub contrast	85	85	85
[ENTER] Execute [RETURN] Quit			

When the adjustment is successfully completed, values changes from default [85].

(**Example:** The following menu)

If it fails, values don't change from default [85].

KC0	28	4786	2423
KC1	27	4799	2664
KC2	27	4809	2005
KC3	26	4331	2440
Sub contrast	46	38	46
[ENTER] Execute [RETURN] Quit			

Adjust Computer-1 input and Computer-2 input both.

<Altitude>

Press **[On/Standby]** and **[Up]** buttons simultaneously.

For it initialize the value, Press **[Keystone]** button.

Select proper value by pressing the **[Left]** or **[Right]** button.

Factory setting is 0.

The value 1 is more than 500m (1,640ft) and under 1,000m (3,281ft).

The value 2 is more than 1,000m (3,281ft) and under 1,500m (4,921ft).

The value 3 is more than 1,500m (4,921ft) and under 2,000m (6,562ft).

The value 4 is more than 2,000m (6,562ft) and under 2,500m (8,202ft).

The value 5 is more than 2,500m (8,202ft) and under 3,000m (9,843ft).

The value 6 is more than 3,000m (9,843ft).

For example, in case of 2,700m altitude set the value to 5.

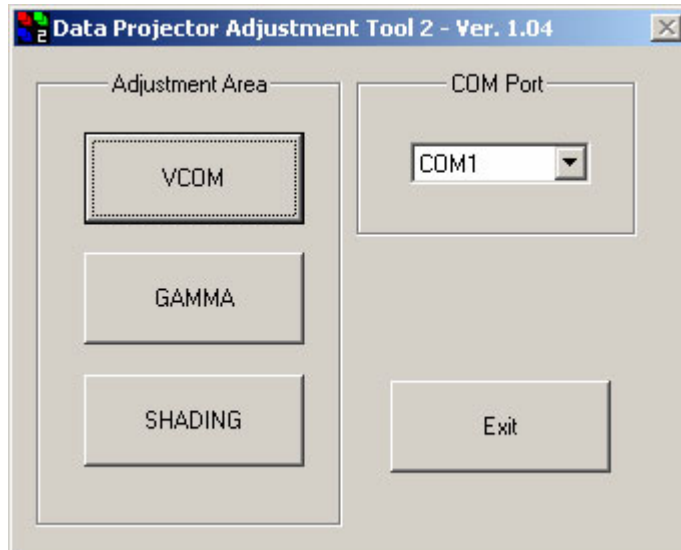
Altitude 0			
Fan control	Auto	Manual	
	Setting	Actual	
Power intake	192	2925	rpm
Ballast	169	3780	rpm
PBS	203	5285	rpm
Exhaust	184	2671	rpm
Intake-BG	182	5285	rpm
Intake-RG	185	5173	rpm
	Actual		
Ballast	26 deg		
Exhaust	63 deg		
Drive-G	0 deg		
Drive-B	0 deg		
Drive-TG	0 deg		
Drive-R	0 deg		
[<] / [>] Adjust		[RETURN] Quit	

Press **[Return]** button.

<VCOM>

Connect the control cable to the control terminal on the projector.
Then plug the RS232C connector on the other end of the cable into a RS232C port on the computer.
Open Windows Explorer navigate to the location where you stored the Adjustment file,
and then double click the **DPJAdjustmentTool.exe**.

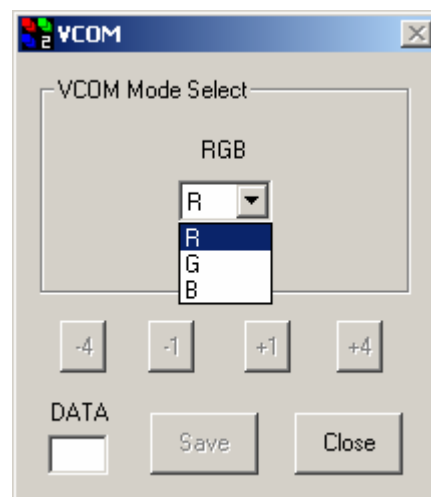
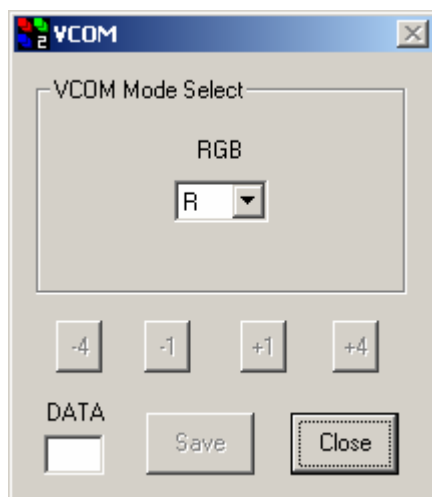
The startup window appears.



Select the COM port. and click the **[VCOM]** button.

The following window appears.

Select the "R".



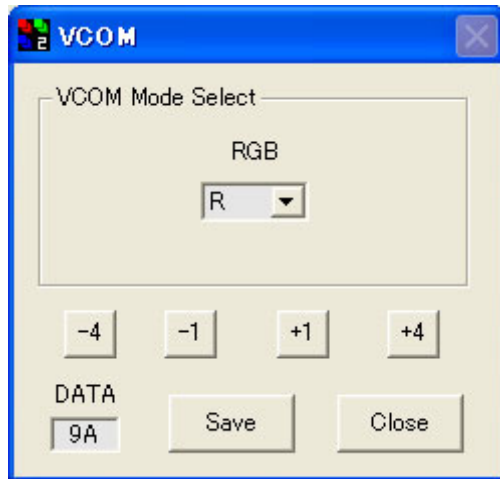
The current data is displayed in DATA column.

Push (+1) or (-1) button.

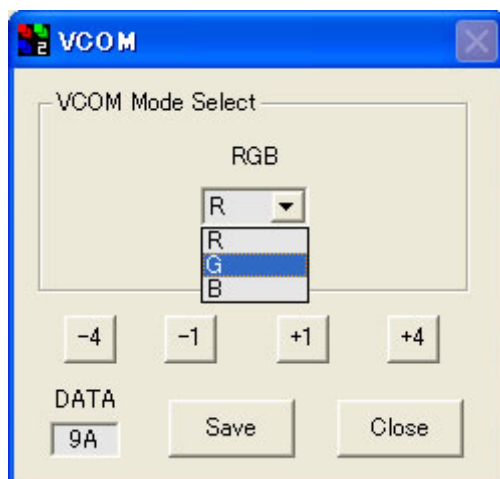
Adjust the data to reduce the flicker to its minimum point.

By pushing the (+4) or (-4), the data is adjusted in greater steps.

After the adjustment, click the **[Save]** to save the data.



Select the "G".



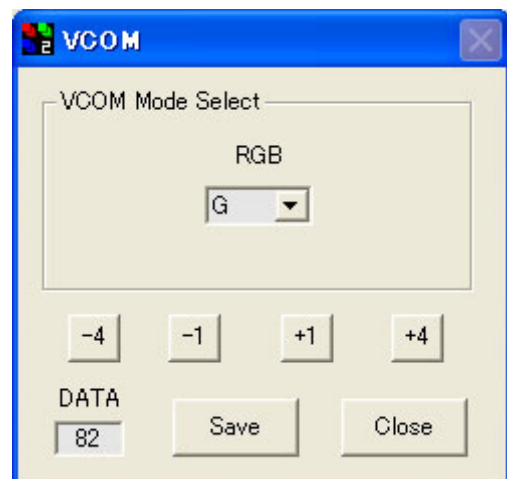
The current data is displayed in DATA column.

Push (+1) or (-1) button.

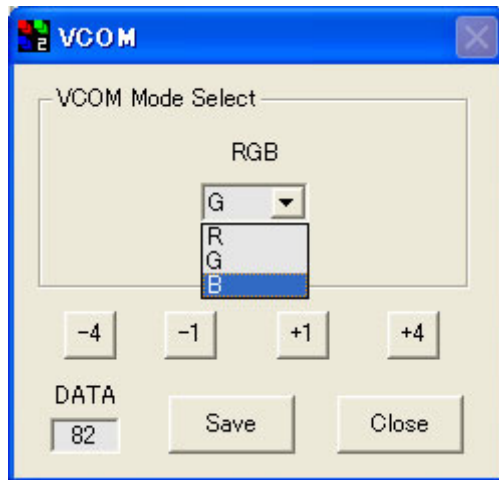
Adjust the data to reduce the flicker to its minimum point.

By pushing the (+4) or (-4), the data is adjusted in greater steps.

After the adjustment, click the **[Save]** to save the data.



Select the "B".



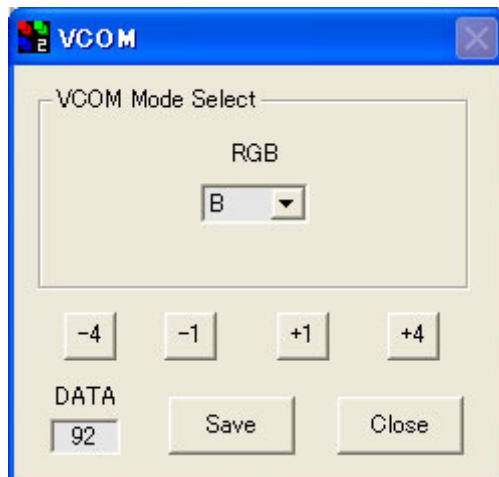
The current data is displayed in DATA column.

Push (+1) or (-1) button.

Adjust the data to reduce the flicker to its minimum point.

By pushing the (+4) or (-4), the data is adjusted in greater steps.

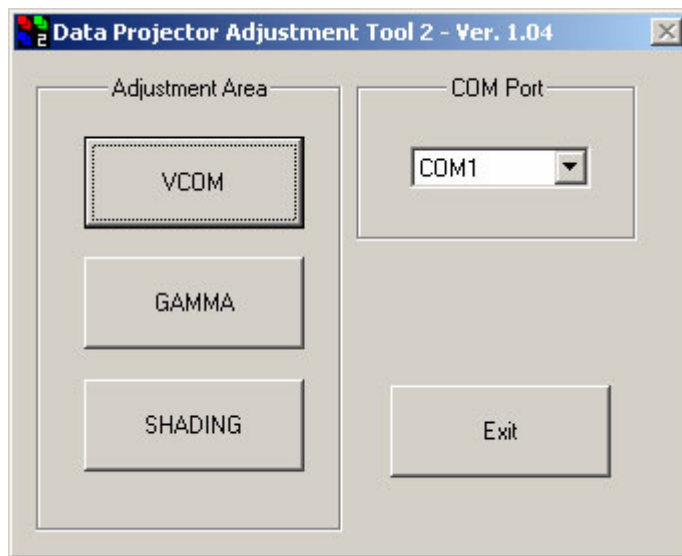
After the adjustment, click the **[Save]** to save the data.



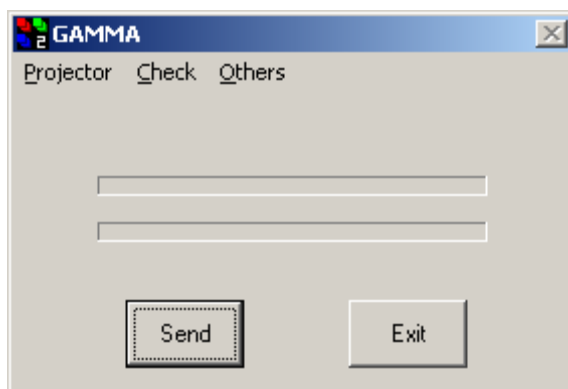
When adjustment of R, G and B finishes, click the **[Close]** button.

<Gamma>

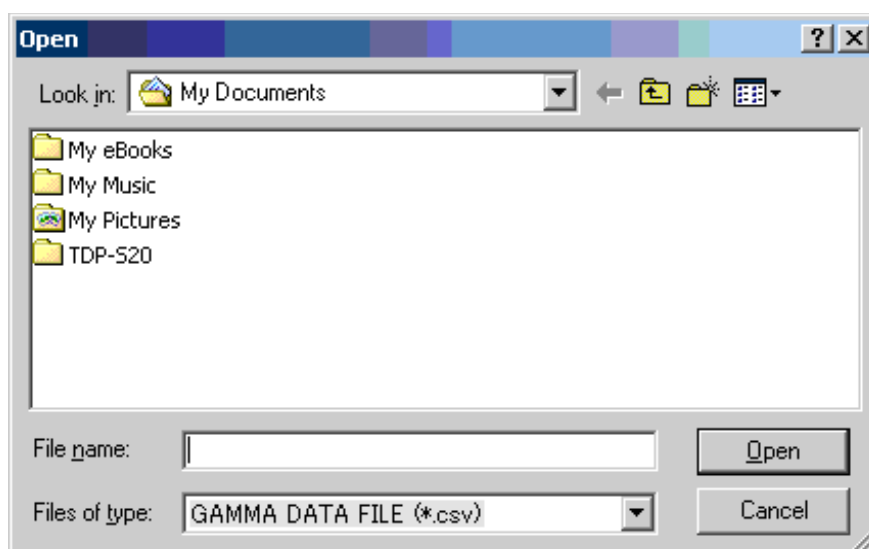
Click the **[GAMMA]** button.



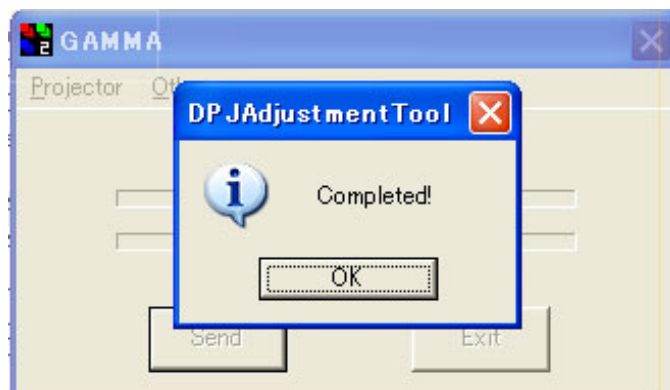
The following window appears.
Click the **[Send]** button.



Select the Gamma data file and click the **[Open]** button. (There are two files for R-type LCD and L-type LCD.)



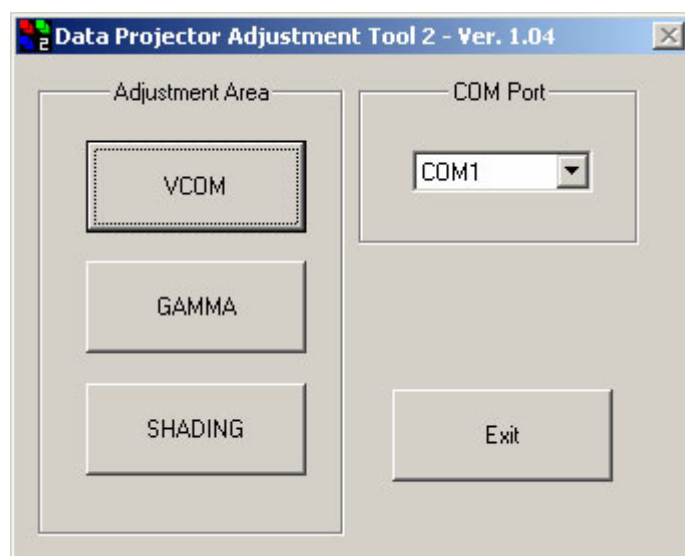
After the transfer is completed, the following message appears.
Click **[OK]** button.



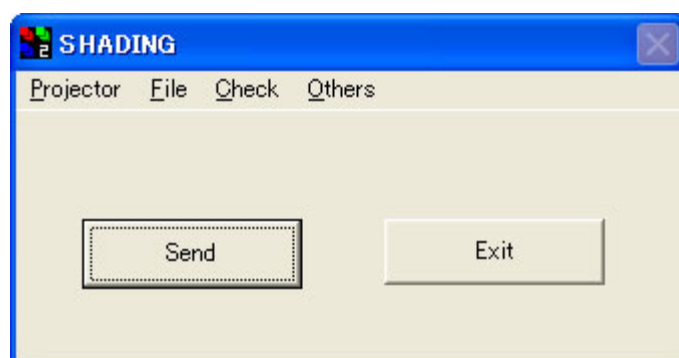
The transferred gamma data will be automatically saved.

<Shading>

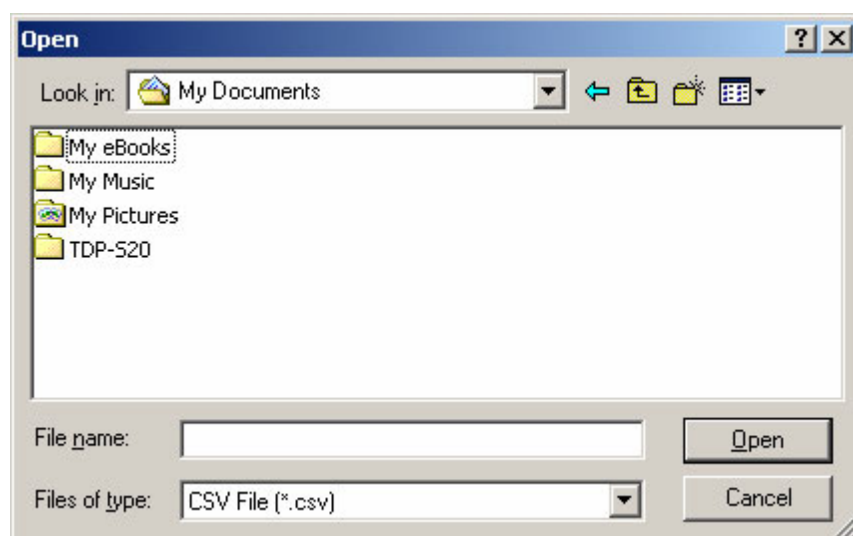
Click the **[SHADING]** button.



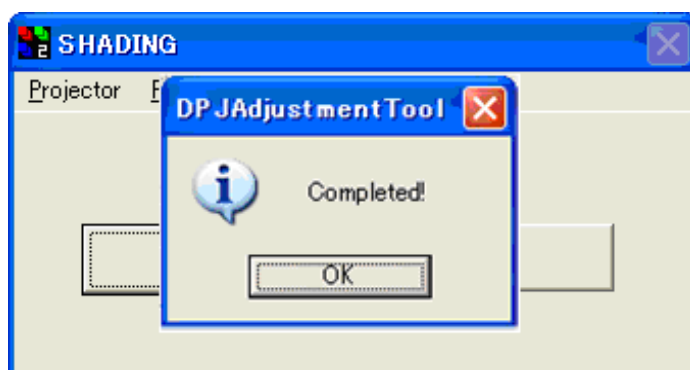
The following window appears.
Click the **[Send]** button.



Select the Shading data file and click the **[Open]** button. (There are two files for R-type LCD and L-type LCD.)



After the transfer is completed, the following message appears.
Click **[OK]** button.



The transferred shading data will be automatically saved.

Functional Test

You perform the functional tests after you've repaired the projector to make sure

All components of the projector operate properly.

You can also perform the functional tests if you're having trouble determining what is wrong with the projector.

Required Equipment

Equipment	Notes
Video player	Make sure the video player has an S-video Out port and cables. The player should also have a Composite video port (RCA). Toshiba strongly suggests you use a DVD player to test the Video quality. DVD players reproduce colors better and project Sharper images. The least preferable is a VCR. If you must use a VCR, make sure you use a commercially produced recording not one recorded from a broadcast source. The VCR must include an S-Video connector in addition to a composite connector.
Commercially produced video	You'll need the video in DVD, etc. format.
Cables	1. RCA Pin jack cable for Composite video & audio. 2. S-video cable. 3. RGB cable that come with the projector. 4. 3.5mm mini-jack cable for PC audio.
Remote control	Ensure that the remote has fresh AAA batteries.
Projector screen	Use a flat screen, not a curved one.
Personal computer (PC)	The stereo audio card should have either a 3.5mm stereo audio Jack or RCA left and right output ports. The PC must have a CD-ROM and must have outputs for RGBHV, VESA, D-sub15pin.

Before beginning

Make sure the work surface where you perform the functional tests is level and clean.

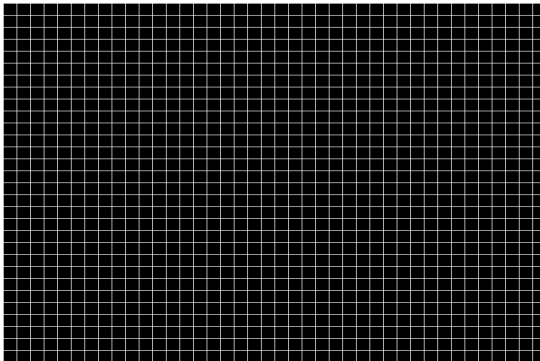
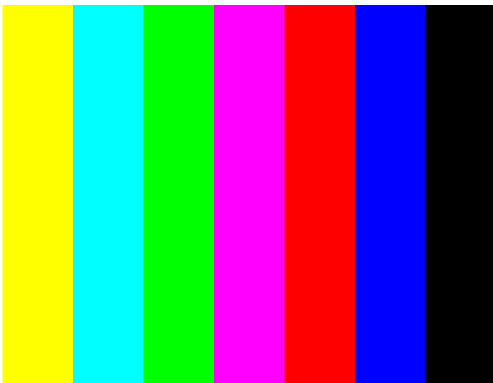
Place the projector on a soft surface (such as an anti-static mat) when running the tests.

Connect the following to the I/O panel on the projector.

1. Video player through Composite Video and S-video ports.
2. Audio sources through Audio ports (RCA) or 3.5mm mini-jack.
3. Personal computer through RGB cable

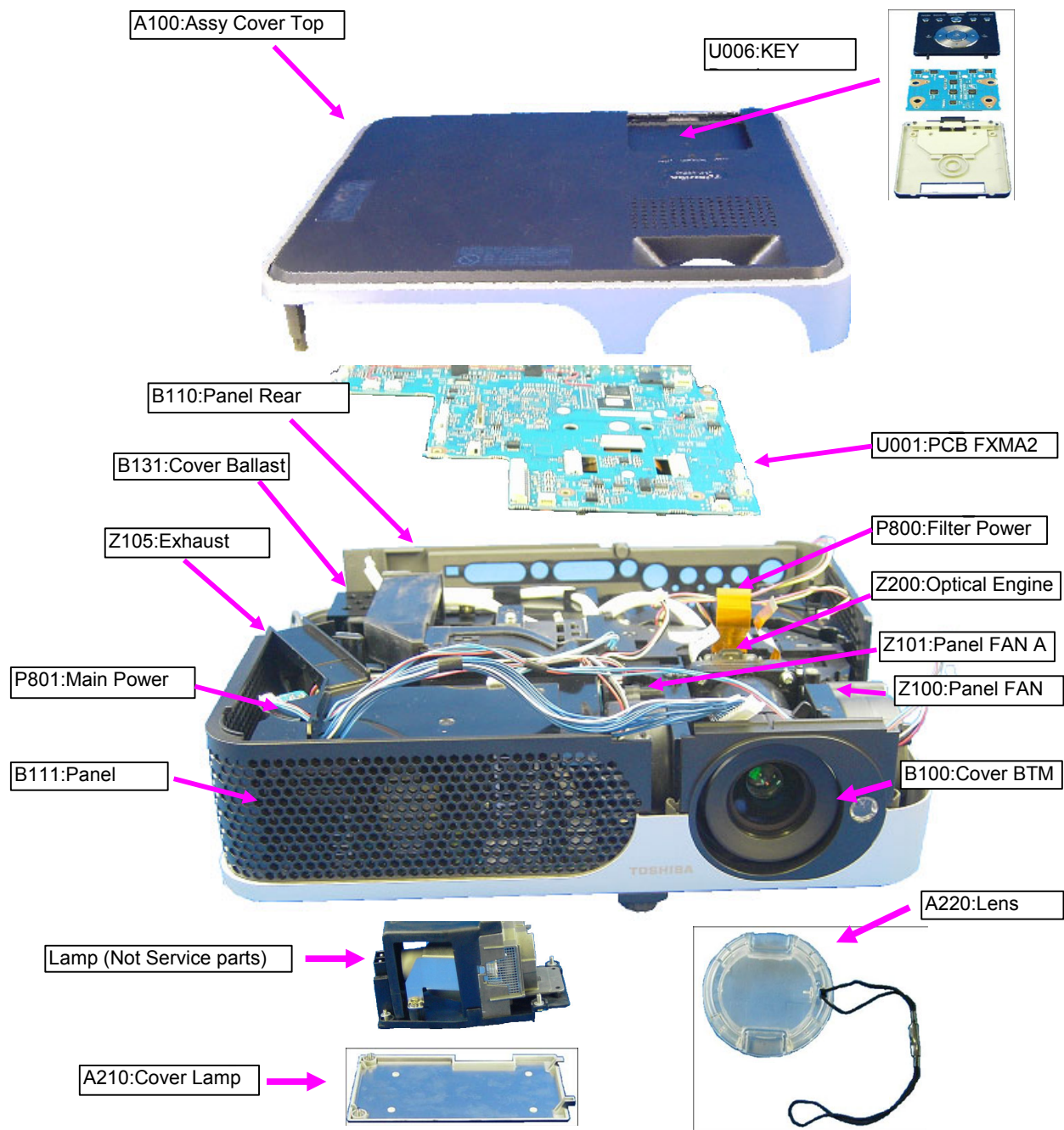
Perform the following tests

Test	Verification
Power Up Connect AC power, and turn the unit on.	Verify that the proper splash (logo) screen Appears. Verify image quality.
Cosmetics and mechanicals Adjust the projector so that the image is Square. Make sure the lens is at a 90 degree angle to the wall.	Verify that the elevator and leveling foot Are functional. Verify that the focus and zoom rings operate properly. Verify cosmetics.
Composite video from video source Connect the yellow composite (RCA) video Connector to the projector. (Ensure that no other video source is connected to the projector)	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
S-Video from video source Connect the S-Video cable to the projector. Disconnect the yellow composite (RCA) Video connector.	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
Image keystone adjustment Connect a video source to the projector.	Verify that image responds properly when You adjust the keystone setting.
Audio from audio source Connect the audio cable to the projector.	Verify that audio source plays through the projector's speaker. Verify that the volume controls function correctly.
Manual source selection Manually select a connected source.	Verify that the projector switches to the manually-selected source. Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
Software Version / Lamp time Used Navigate through the Basic menu to the Setup menu. Navigate to the Service menu. Select info from the Service menu.	Verify software version Verify the keys are not sticky. Verify that the software version is current and that the lamp is within its service life.

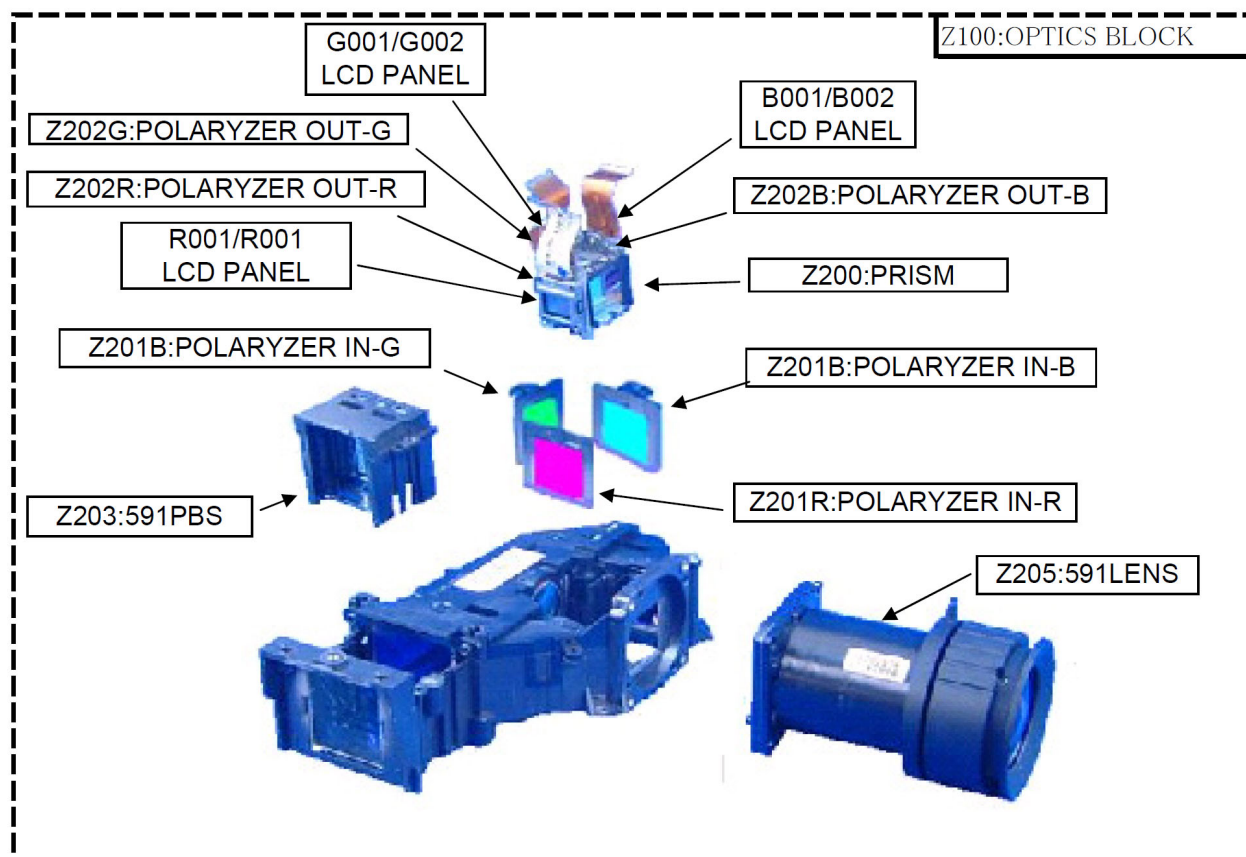
Test	Verification
Focus SINGOWS2000 Cross Hatch image.	Verify that the image synchronizes properly through the computer 1 input.  Verify that image focuses through the full zoom range. Verify there are no problems.
Color Wheel Index Delay SINGOWS2000 Color bar image.	Verify that the image synchronizes properly through the computer 1 input.  Verify that the color is located in a line. Verify there are no problems

Spare Parts List

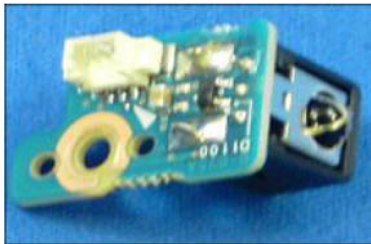
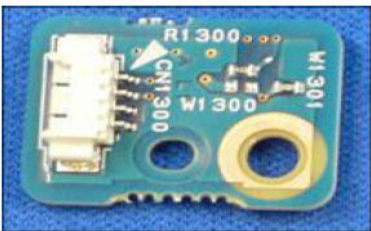

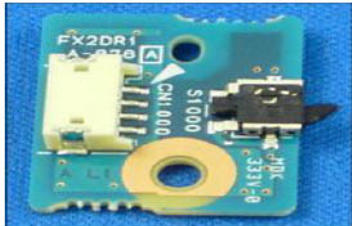
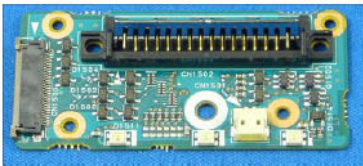

Exploded View



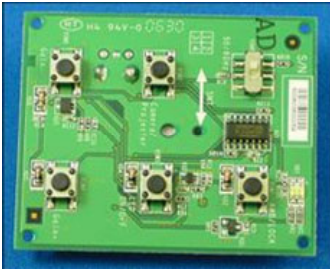



Exploded View(Optics Block)



Other Parts

U002 Remote Board	 A small green printed circuit board (PCB) with a yellow connector on the left and a black component on the right. It has a circular hole in the center.
U003 Exhaust Sensor Board	 A green PCB with a yellow connector on the left and a circular hole in the center. It features several electronic components, including a resistor labeled R1300 and a capacitor labeled W1300.
U004 Sensor Board	 A green PCB with a yellow connector on the left and a circular hole in the center. It has a black component on the right and a resistor labeled R1300.
U005 Door SW Board	 A green PCB with a yellow connector on the left and a circular hole in the center. It features a black component on the right and a resistor labeled R1300.
U007 Relay Board	 A green PCB with a yellow connector on the left and a circular hole in the center. It has a black component on the right and a resistor labeled R1300.
MJ02 Thermal Switch	 A white, flexible, wavy cable with a blue connector at the end.

<p>MC11 Camera Main</p>	 A green printed circuit board (PCB) populated with various electronic components. It features a large central square component, several integrated circuits, capacitors, and connectors along the edges.
<p>MC12 Camera CMOS</p>	 A small electronic module with a green PCB. It has a prominent black, circular, ribbed lens or filter mounted on top, and several pins or connectors are visible along the bottom edge.
<p>MC13 Camera Key</p>	 A green PCB with several small, square surface-mount components, likely microswitches or sensors, arranged in a grid-like pattern. There are also some larger components and connectors.
<p>MC14 Camera LED</p>	 A module featuring a circular array of small, square LED chips mounted on a green PCB. The array is protected by a clear, circular lens. The PCB has some connectors and other components visible.

Spare parts list (TLP-X2500 series)

GREEN

No	Location	Description	Part No			
			E	B	U	CH
1	A100	COVER ASSY, TOP				75004216
2	A101	SCREW, 2.0 X 4.0 MM				70391261
3	A102A	SCREW				23738144
4	A110	CASE ASSY, CONTROL UP				75004217
5	A110A	SCREW, 2.0 X 4.0 MM				70391261
6	A111	CASE ASSY, CONT LOWER				75004218
7	A111A	SCREW, 2.0 X 4.0 MM				70391261
8	A210	COVER ASSY, LAMP				75004221
9	A220	CAP, LENS				75004222
10	A230	COVER ASSY, FILTER BOTTOM				75004223
11	A401	CARTON BOX, X2000				75004232
12	A405	SOFT CASE, X2000				75004233
13	B001	LCD PANEL, L3P06X-66G00B				75004771
14	B002	LCD PANEL, L3P06X-65G00B				75004767
15	B100	COVER ASSY, BOTTOM				75004219
16	B111	PANEL, FRONT				75004225
17	B112	PANEL, SIDE				75004226
18	B113	PANEL ASSY, LENS				75004227
19	B120	PLATE, AC-IN				75004230
20	B131	COVER, LAMP				75004220
21	B141	AIR DUCT, POWER FAN				75004229
22	B170	AIR DUCT				75004228
23	CN105	CONNECTOR, 1.25MM PITCH W TO B				75002110
24	CN108	CONNECTOR, 1.25MM PITCH W TO B				75002110
25	CN503	CONNECTOR, D-SUB, DZ11A92-ND201-7F				75004141
26	E255	LENS, ANLC03T				75004215
27	E270	HOLDER ASSY, LAMP				75004231
28	G001	LCD PANEL, L3P06X-65G00G				75004766
29	G002	LCD PANEL, L3P06X-66G00G				75004769
30	IC100	IC, PW190-10L, IMAGE PROCESSOR				75004414
31	IC101	IC, BD87A29FVM-TR, VOLTAGE DETECTOR				75004425
32	IC104	IC, PQ1MX55M2SPQ, LOW VOLTAGE REGULATOR				75004417
33	IC105	IC, TK11150CSCL-G, POSITIVE LDO REGULATOR				75004418
34	IC107	IC, ES29LV160ET-70TGI				75004763
35	IC1100	IC, PNA4612M01TH, PD WITH REMOTE CONT				75001241
36	IC111	IC, TC7SH08FU(TE85L,F)				75001245
37	IC112	IC, L3232ECV-16Z-T				75004413
38	IC119	IC, LTC3701EGN#TRPBF, DC/DC CONTROLLER				75004148
39	IC1200	IC, G751-2RDF, TEMPERATURE SENSOR AND THERMAL				75004147
40	IC122	IC, TC7SH08FU(TE85L,F)				75001245
41	IC123	IC, TC7SH08FU(TE85L,F)				75001245

No	Location	Description	Part No			
			E	B	U	CH
42	IC124	IC, SN74AHCT1G08DCKR, 2 INPUT AND GATE	75004410			
43	IC125	IC, SN74AHCT1G08DCKR, 2 INPUT AND GATE	75004410			
44	IC126	IC, BD4843G-TR, VOLTAGE DETECTOR	75004150			
45	IC127	IC, TC7SH08FU(TE85L,F)	75001245			
46	IC129	IC, TC7SH08FU(TE85L,F)	75001245			
47	IC1300	IC, G751-2RDF, TEMPERATURE SENSOR AND THERMAL	75004147			
48	IC350	IC, TC7WBD126AFK(T5L,F, DUAL BUS SWITCH	75001220			
49	IC351	IC, G768BF, TEMPERATURE SENSOR AND FAN CONTROLLER	75004146			
50	IC352	IC, G794D5U, TEMPERATURE SENSOR AND 4FAN CONTROLLER	75004421			
51	IC353	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR	75004422			
52	IC354	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR	75004422			
53	IC355	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR	75004422			
54	IC356	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR	75004422			
55	IC357	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR	75004422			
56	IC358	IC, M62334FP DF5J, D/A CONVERTER	75001226			
57	IC359	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR	75004422			
58	IC501	IC, XC95144XL-10TQG100C-X2000	75004143			
59	IC502	IC, MXD2020EL-T/R, ACCELEROMETER	75004419			
60	IC503	IC, MAX4885ETJ+TG40, ANALOG SWITCH	75004151			
61	IC504	IC, EL4340IUZ-T7, MULTIPLEXING AMPLIFIER	75004429			
62	IC505	IC, SN74LVC2G17DCKR, DUAL SCHMITT-TRIGGER BUFFER	75004411			
63	IC506	IC, EL4332CSZ-T7, VIDEO MULTIPLEXING	75001323			
64	IC507	IC, EL5106IWZ-T7, GAIN AMPLIFIER	75004430			
65	IC508	IC, EL5106IWZ-T7, GAIN AMPLIFIER	75004430			
66	IC509	IC, SN74LVC2G17DCKR, DUAL SCHMITT-TRIGGER BUFFER	75004411			
67	IC510	IC, SN74LVC2G17DCKR, DUAL SCHMITT-TRIGGER BUFFER	75004411			
68	IC511	IC, ISL59885ISZ-T7, VIDEO SYNC SEPARATOR	75004424			

No	Location	Description	Part No			
			E	B	U	CH
69	IC512	IC, ISL59885ISZ-T7, VIDEO SYNC SEPARATOR				75004424
70	IC513	IC, BU9882FV-WE2, 2KBIT EEPROM				75004415
71	IC514	IC, MM1565AFBE, VOLTAGE REGULATOR				75004420
72	IC515	IC, LM2660MM, SWITCHED CAPACITOR VOLTAGE CON				75001237
73	IC6001	IC, NJM2370U1-09-TE1, VOLTAGE REGULATOR				75001239
74	IC6002	IC, NJM2370U1-09-TE1, VOLTAGE REGULATOR				75001239
75	IC6003	IC, NJM2886DL3-05(TE1), LOW DROPOUT VOLTAGE REGULATOR				75004427
76	IC6004	IC, TPA2005D1DGNRG4, AUDIO POWER AMPLIFIER				75004428
77	IC6005	IC, NJW1142AV(TE1), AUDIO PROCESSOR				75004426
78	IC6010	IC, EL1883ISZ-T7, SYNC SEPARATOR				75004423
79	IC6011	IC, EL1883ISZ-T7, SYNC SEPARATOR				75004423
80	IC6012	IC, TC7SH08FU(TE85L,F)				75001245
81	IC6021	IC, TC7SH08FU(TE85L,F)				75001245
82	IC701	IC, PQ20VZ1UJ00H, LOW VOLTAGE REGULATOR				75004416
83	IC702	IC, R1172H121D-T1-F, VOLTAGE REGULATOR				75004762
84	IC703	IC, TC7SH08FU(TE85L,F)				75001245
85	IC704	IC, L3E07110K0A,TIMING PULSE GENERATOR				75004760
86	IC801	IC, L3E06150S2A,TFT-LCD CONTROLLER				75004761
87	IC802	IC, L3E01060P0A				75004759
88	IC831	IC, L3E06150S2A,TFT-LCD CONTROLLER				75004761
89	IC832	IC, L3E01060P0A				75004759
90	IC861	IC, L3E06150S2A,TFT-LCD CONTROLLER				75004761
91	IC862	IC, L3E01060P0A				75004759
92	J6001	CONNECTOR, LAP5300-0110F				75004140
93	MJ02	SWITCH, THERMAL SWITCH WITH WIRE HARNESS				75005121
94	P800	PC BOARD ASSY, LINE-FILTER, APS-T602				23122519
95	P801	PC BOARD ASSY, MAIN POWER, APS-T603				23122520
96	P850	PC BOARD ASSY, LAMP POWER, PS-240A-MS-120-22H				75004203
97	Q101	TRANSISTOR, UM6K1NTN, N-CH MOS FET MODULE				75004142
98	R001	LCD PANEL, L3P06X-66G00R				75004768
99	R002	LCD PANEL, L3P06X-65G00R				75004764

No	Location	Description	Part No			
			E	B	U	CH
100	S1605	SWITCH, TACT, TSW-6A-1-16-T50	75004139			
101	S501	SWITCH, SLIDE, SLD-12-500	75004138			
102	SP200	SPEAKER, RFF-0401C-02	23351359			
103	U001	PC BOARD ASSY, MAIN, FX5MA2, TLP-X2500	75004673			
104	U002	PC BOARD ASSY, REMOCON, FX5RE2, TLP-X2500	75004674			
105	U003	PC BOARD ASSY, EXTERNAL, FX5EX2, TLP-X2500	75004675			
106	U004	PC BOARD ASSY, SENSOR, FX5SE2, TLP-X2500	75004676			
107	U005	PC BOARD ASSY, DOOR SWITCH, FX5DR2, TLP-X2500	75004677			
108	U006	PC BOARD ASSY, KEY, FX5KY2, TLP-X2500	75004678			
109	U007	PC BOARD ASSY, FX2RL2	75004131			
110	Y100	CABLE, RGB, BLUE	23368955			
111	Y200	OWNERS MANUAL, X2500U/E/B/J	75004777			
112	Y200	OWNERS MANUAL, X2500C				Not issue yet
113	Y205	OWNER'S MANUAL, X2000SERIES ERRATA	75004435			
114	Y260	POWER CORD, CEE250V6A 3M	23372167			
115	Y260	POWER CORD, UL125V10A 3M			23372148	
116	Y260	POWER CORD SET, UK250V6A		23372337		
117	Y260	POWER CORD, GB250V10A				23372155
118	Y700	REMOCON HAND UNIT, CT-90266	75004774			
119	Y702	REMOCON RECIVER, IR, MOUS, CR-916	23306621			
120	Z100	FAN, TYF450FJ06	75004190			
121	Z100	OPTICAL BLOCK, ENGINE, CJ590TA	75004775			
122	Z101	FAN, TYF400FJ10	75004160			
123	Z102	FAN, D05F-12BS2 02A	23125960			
124	Z103	FAN, TYF310FJ11	75004159			
125	Z104	FAN, D05F-12PS7 01A(EX)	75004191			
126	Z105	FAN, D07R-12TH 03A(EX)	75004192			
127	Z200	OPTICAL BLOCK, SUB ASSY, 590SUB	75004776			
128	Z201B	POLARIZER, 591IN-B	75004210			
129	Z201G	POLARIZER, 591IN-G	75004209			
130	Z201R	POLARIZER, 591IN-R	75004208			
131	Z202B	POLARIZER, 591OUT-B	75004213			
132	Z202G	POLARIZER, 591OUT-G	75004212			
133	Z202R	POLARIZER, 591OUT-R	75004211			
134	Z203	LENS, 591PBS	75004214			
135	Z205	LENS, 591LENS	75004206			

Spare parts list (TLP-XC2500 series)

GREEN

No	Location	Description	Part No			
			E	B	U	CH
1	A100	COVER ASSY, TOP				75005265
2	A101	SCREW, 2.0 X 4.0 MM				70391261
3	A102A	SCREW				23738144
4	A110	CASE ASSY, CONTROL UP				75004217
5	A110A	SCREW, 2.0 X 4.0 MM				70391261
6	A111	CASE ASSY, CONT LOWER				75004218
7	A111A	SCREW, 2.0 X 4.0 MM				70391261
8	A210	COVER ASSY, LAMP				75004221
9	A220	CAP, LENS				75004222
10	A230	COVER ASSY, FILTER BOTTOM				75004223
11	A303	LABEL, CAUTION, BTM, TW95				23515736
12	A304	LABEL, CAUTION				75004197
13	A305	LABEL, CAUTION HOT BLACK				75004198
14	A306	LABEL, LABEL CAUTION, LENS BLACK				75004200
15	A307	LABEL, CARTON				75005437
16	A308	LABEL, TOP TAG				75005438
17	A310	LABEL, CASE LOWER, X2000				75004201
18	A311	LABEL, CONTROL TOP, X2000				75004202
19	A401	CARTON BOX, XC2000				75005267
20	A401B	SHEET, PROTECTIVE 700X300				75004234
21	A405	SOFT CASE, XC2000				75005268
22	A502	LABEL				23564859
23	B001	LCD PANEL, L3P06X-66G00B				75004771
24	B002	LCD PANEL, L3P06X-65G00B				75004767
25	B100	COVER ASSY, BOTTOM				75004219
26	B111	PANEL, FRONT				75004225
27	B112	PANEL, CAMERA INTAKE				75005266
28	B113	PANEL ASSY, LENS				75004227
29	B120	PLATE, AC-IN				75004230
30	B131	COVER, LAMP				75004220
31	B141	AIR DUCT, POWER FAN				75004229
32	B170	AIR DUCT				75004228
33	B362	SCREW, PB2.6X6, D960060				23717047
34	CN105	CONNECTOR, 1.25MM PITCH W TO B				75002110
35	CN108	CONNECTOR, 1.25MM PITCH W TO B				75002110
36	CN503	CONNECTOR, D-SUB, DZ11A92-ND201-7F				75004141
37	E255	LENS, ANLC03T				75004215
38	E270	HOLDER ASSY, LAMP				75004231
39	G001	LCD PANEL, L3P06X-65G00G				75004766
40	G002	LCD PANEL, L3P06X-66G00G				75004769
41	IC100	IC, PW190-10L, IMAGE PROCESSOR				75004414
42	IC101	IC, BD87A29FVM-TR, VOLTAGE DETECTOR				75004425
43	IC104	IC, PQ1MX55M2SPQ, LOW VOLTAGE REGULATOR				75004417
44	IC105	IC, TK11150CSCL-G, POSITIVE LDO REGULATOR				75004418

No	Location	Description	Part No			
			E	B	U	CH
45	IC107	IC, ES29LV160ET-70TGI				75004763
46	IC1100	IC, PNA4612M01TH, PD WITH REMOTE CONT				75001241
47	IC111	IC, TC7SH08FU(TE85L,F)				75001245
48	IC112	IC, L3232ECV-16Z-T				75004413
49	IC119	IC, LTC3701EGN#TRPBF, DC/DC CONTROLLER				75004148
50	IC1200	IC, G751-2RDF, TEMPERATURE SENSOR AND THERMAL				75004147
51	IC122	IC, TC7SH08FU(TE85L,F)				75001245
52	IC123	IC, TC7SH08FU(TE85L,F)				75001245
53	IC124	IC, SN74AHCT1G08DCKR, 2 INPUT AND GATE				75004410
54	IC125	IC, SN74AHCT1G08DCKR, 2 INPUT AND GATE				75004410
55	IC126	IC, BD4843G-TR, VOLTAGE DETECTOR				75004150
56	IC127	IC, TC7SH08FU(TE85L,F)				75001245
57	IC129	IC, TC7SH08FU(TE85L,F)				75001245
58	IC1300	IC, G751-2RDF, TEMPERATURE SENSOR AND THERMAL				75004147
59	IC350	IC, TC7WBD126AFK(T5L,F, DUAL BUS SWITCH				75001220
60	IC351	IC, G768BF, TEMPERATURE SENSOR AND FAN CONTROLLER				75004146
61	IC352	IC, G794D5U, TEMPERATURE SENSOR AND 4FAN CONTROLLER				75004421
62	IC353	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR				75004422
63	IC354	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR				75004422
64	IC355	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR				75004422
65	IC356	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR				75004422
66	IC357	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR				75004422
67	IC358	IC, M62334FP DF5J, D/A CONVERTER				75001226
68	IC359	IC, PQ200WNA1ZPH, VOLTAGE REGULATOR				75004422
69	IC501	IC, XC95144XL-10TQG100C-X2000				75004143
70	IC502	IC, MXD2020EL-T/R, ACCELEROMETER				75004419
71	IC503	IC, MAX4885ETJ+TG40, ANALOG SWITCH				75004151
72	IC504	IC, EL4340IUZ-T7, MULTIPLEXING AMPLIFIER				75004429
73	IC505	IC, SN74LVC2G17DCKR, DUAL SCHMITT-TRIGGER BUFFER				75004411
74	IC506	IC, EL4332CSZ-T7, VIDEO MULTIPLEXING				75001323
75	IC507	IC, EL5106IWZ-T7, GAIN AMPLIFIER				75004430
76	IC508	IC, EL5106IWZ-T7, GAIN AMPLIFIER				75004430

No	Location	Description	Part No			
			E	B	U	CH
77	IC509	IC, SN74LVC2G17DCKR, DUAL SCHMITT-TRIGGER BUFFER	75004411			
78	IC510	IC, SN74LVC2G17DCKR, DUAL SCHMITT-TRIGGER BUFFER	75004411			
79	IC511	IC, ISL59885ISZ-T7, VIDEO SYNC SEPARATOR	75004424			
80	IC512	IC, ISL59885ISZ-T7, VIDEO SYNC SEPARATOR	75004424			
81	IC513	IC, BU9882FV-WE2, 2KBIT EEPROM	75004415			
82	IC514	IC, MM1565AFBE, VOLTAGE REGULATOR	75004420			
83	IC515	IC, LM2660MM, SWITCHED CAPACITOR VOLTAGE CON	75001237			
84	IC6001	IC, NJM2370U1-09-TE1, VOLTAGE REGULATOR	75001239			
85	IC6002	IC, NJM2370U1-09-TE1, VOLTAGE REGULATOR	75001239			
86	IC6003	IC, NJM2886DL3-05(TE1), LOW DROPOUT VOLTAGE REGULATOR	75004427			
87	IC6004	IC, TPA2005D1DGNRG4, AUDIO POWER AMPLIFIER	75004428			
88	IC6005	IC, NJW1142AV(TE1), AUDIO PROCESSOR	75004426			
89	IC6010	IC, EL1883ISZ-T7, SYNC SEPARATOR	75004423			
90	IC6011	IC, EL1883ISZ-T7, SYNC SEPARATOR	75004423			
91	IC6012	IC, TC7SH08FU(TE85L,F)	75001245			
92	IC6021	IC, TC7SH08FU(TE85L,F)	75001245			
93	IC701	IC, PQ20VZ1UJ00H, LOW VOLTAGE REGULATOR	75004416			
94	IC702	IC, R1172H121D-T1-F, VOLTAGE REGULATOR	75004762			
95	IC703	IC, TC7SH08FU(TE85L,F)	75001245			
96	IC704	IC, L3E07110K0A,TIMING PULSE GENERATOR	75004760			
97	IC801	IC, L3E06150S2A,TFT-LCD CONTROLLER	75004761			
98	IC802	IC, L3E01060P0A	75004759			
99	IC831	IC, L3E06150S2A,TFT-LCD CONTROLLER	75004761			
100	IC832	IC, L3E01060P0A	75004759			
101	IC861	IC, L3E06150S2A,TFT-LCD CONTROLLER	75004761			
102	IC862	IC, L3E01060P0A	75004759			
103	J6001	CONNECTOR, LAP5300-0110F	75004140			
104	MC11	PC BOARD ASSY, CAMERA MAIN, AVM-CM01-MAIN	75005377			
105	MC12	PC BOARD ASSY, CAMERA CMOS, AVM-CM01-CMOS	75005378			
106	MC13	PC BOARD ASSY, CAMERA KEY, AVM-CM01-KEY	75005379			
107	MC14	PC BOARD ASSY, CAMERA LED, AVM-CM01-LED	75005380			

No	Location	Description	Part No			
			E	B	U	CH
108	MJ02	SWITCH, THERMAL SWITCH WITH WIRE HARNESS	75005121			
109	P800	PC BOARD ASSY, LINE-FILTER, APS-T602	23122519			
110	P801	PC BOARD ASSY, MAIN POWER, APS-T603	23122520			
111	P850	PC BOARD ASSY, LAMP POWER, PS-240A-MS-120-22H	75004203			
112	Q101	TRANSISTOR, UM6K1NTN, N-CH MOS FET MODULE	75004142			
113	R001	LCD PANEL, L3P06X-66G00R	75004768			
114	R002	LCD PANEL, L3P06X-65G00R	75004764			
115	S1605	SWITCH, TACT, TSW-6A-1-16-T50	75004139			
116	S501	SWITCH, SLIDE, SLD-12-500	75004138			
117	SP200	SPEAKER, RFF-0401C-02	23351359			
118	U001	PC BOARD ASSY, MAIN, FX5MA2	75005431			
119	U002	PC BOARD ASSY, RELAY, FX5RE2	75005432			
120	U003	PC BOARD ASSY, EXHAUST SENSOR, FX5EX2	75005433			
121	U004	PC BOARD ASSY, SENSOR, FX5SE2	75005434			
122	U005	PC BOARD ASSY, DOOR SWITCH, FX5DR2	75005435			
123	U006	PC BOARD ASSY, KEY, FX5KY2	75005436			
124	U007	PC BOARD ASSY, RELAY, FX2RL2	75004131			
125	Y100	CABLE, RGB, BLUE	23368955			
126	Y200	OWNERS MANUAL, X2500U/E/B/J	75004777			
127	Y200	OWNERS MANUAL, X2500C				
128	Y260	POWER CORD, CEE250V6A 3M	23372167			
129	Y260	POWER CORD, UL125V10A 3M			23372148	
130	Y260	POWER CORD SET, UK250V6A		23372337		
131	Y260	POWER CORD, GB250V10A				23372155
132	Y700	REMOCON HAND UNIT, CT-90267	75005439			
133	Y702	REMOCON RECIVER, IR, MOUS, CR-916	23306621			
134	Z100	FAN, TYF450FJ06	75004190			
135	Z100	OPTICAL BLOCK, ENGINE, CJ590TA	75004775			
136	Z101	FAN, TYF400FJ10	75004160			
137	Z102	FAN, D05F-12BS2 02A	23125960			
138	Z103	FAN, TYF310FJ11	75004159			
139	Z104	FAN, D05F-12PS7 01A(EX)	75004191			
140	Z105	FAN, D07R-12TH 03A(EX)	75004192			
141	Z200	OPTICAL BLOCK, SUB ASSY, 590SUB	75004776			
142	Z201B	POLARIZER, 591IN-B	75004210			
143	Z201G	POLARIZER, 591IN-G	75004209			
144	Z201R	POLARIZER, 591IN-R	75004208			
145	Z202B	POLARIZER, 591OUT-B	75004213			
146	Z202G	POLARIZER, 591OUT-G	75004212			
147	Z202R	POLARIZER, 591OUT-R	75004211			
148	Z203	LENS, 591PBS	75004214			
149	Z205	LENS, 591LENS	75004206			

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